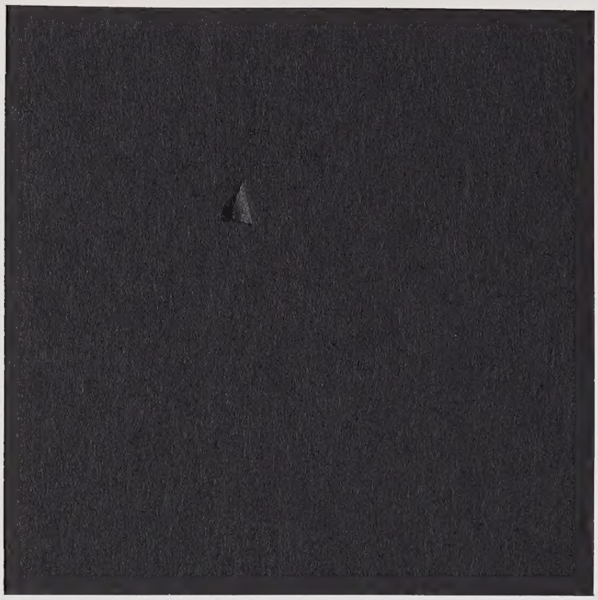
DRAFT SUBSEQUENT ENVIRONMENTAL IMPACT REPORT FOR THE REDWOOD CREEK VILLAGE

CERTIFIED



DRAFT SUBSEQUENT ENVIRONMENTAL IMPACT REPORT FOR THE REDWOOD CREEK VILLAGE

Prepared for:

THE CITY OF OAKLAND

APRIL 1993

File No. ER91-108

RELEASE OF REPORT FOR PUBLIC REVIEW
City of Oakland, California

California Environmental Quality Act (CEQA)
DRAFT ENVIRONMENTAL IMPACT REPORT FOR:

Redwood Creek Village

The City of Oakland is hereby releasing this Draft Environmental Impact Report (EIR), finding it to be accurate and complete and ready for public review. Members of the public are invited to respond to the EIR. Comments should focus on the sufficiency of the EIR in discussing possible impacts on the environment, ways in which adverse effects might be minimized, and alternatives to the project in light of the EIR's purpose to provide useful and accurate information about such factors. Please address all comments to the Oakland City Planning Commission, Attention Stanley I. Muraoka, Acting Environmental Review Coordinator, Oakland City Planning Department, 1330 Broadway, Suite 310, Oakland, CA 94612. Comments should be received no later than Friday, June 11, 1993.

X The City Planning Commission will conduct a public hearing on the Draft EIR on May 26, 1993 at 6:30 p.m. in the Garden Center, Lakeside Park, 666 Bellevue Avenue.

X After all comments are received, a Final EIR will be prepared and considered for acceptance by the City Planning Commission on (to be scheduled) at 6:30 p.m. in the Garden Center, Lakeside Park, 666 Bellevue Avenue.

X The Draft EIR is attached.

X The Draft EIR is available at the City Planning Department.

If you have any questions, please telephone the City Planning Department at 238-3941. Ask for Robin NiDana.

ALVIN D. JAMES
Director of City Planning

by STANLEY I. MURAOKA
Acting Environmental Review Coordinator

DRAFT SUBSEQUENT

ENVIRONMENTAL IMPACT REPORT

FOR THE

REDWOOD CREEK VILLAGE

Prepared for:

THE CITY OF OAKLAND

April 1993

Prepared by:

CERTIFIED/EARTH METRICS
7000 Marina Boulevard, 4th Floor
Brisbane, CA 94005
(415) 742-9900

S11800A

TABLE OF CONTENTS

TABLE OF CONTENTS (CONTINUED)

LIST OF FIGURES

LIST OF FIGURES (CONTINUED)

LIST OF TABLES

1. PREFACE

Pursuant to the California Environmental Quality Act (CEQA) of 1970, the City of Oakland, Lead Agency, has determined that an Environmental Impact Report (EIR) is required for the proposed Redwood Creek Village project. The purpose of the EIR is to provide objective information to the Lead Agency, responsible and trustee agencies, public decision makers, and the general public on the potential adverse environmental effects of project implementation. When acting on the application, the Lead Agency may adopt recommended mitigation measures to reduce adverse impacts to less-than-significant levels or may consider alternatives to the project. Identified significant adverse impacts which cannot be mitigated to below a level of significance are required to be recognized by a Statement of Overriding Considerations, indicating that the benefits expected from the project offset the identified significant unavoidable impacts.

This EIR has been prepared according to CEQA and the Guidelines published by the State Resources Agency. CEQA directs that the EIR should focus upon the significant environmental effects which have "a substantial adverse impact on the environment." CEQA Guidelines advise that "significant effects be discussed with emphasis in proportion to their severity and their probability of occurrence" (Section 15143). In this report impacts identified as less-than-significant or as beneficial may also be discussed.

Based on the December 4, 1991, Initial Study (Appendix A) and other information provided by the Lead Agency, the areas of potential adverse environmental impact for this project are:

- Grading, topographic changes, and land stability;
- Drainage patterns and water quality, including effects on Redwood Creek;
- Wildlife habitats;
- Vegetation removal;
- Visual impacts on adjacent residential neighborhoods and regional parks;
- Cumulative impacts on adjacent residential neighborhoods and regional parks;
- Local circulation impacts within the proposed project;
- Construction noise; and
- Cumulative impacts of this and other nearby projects on public services, facilities, and utilities.

Basing the focus of the EIR upon information provided by the Lead Agency conforms to CEQA Guidelines (Section 15143). This EIR also uses information from other EIRs and public documents, as directed by CEQA Guidelines (Section 15150).

The Lead Agency is required to have a monitoring/reporting program for mitigation measures to assure the implementation of these measures (Public Resources Code 21081.b). Certain issue areas were not analyzed in this EIR because significant adverse environmental impacts were not expected. These issue areas are identified in Section 3.

CEQA Guidelines [Section 15125(c)] direct that EIR mitigation measures shall distinguish between ones proposed by the project applicant and ones proposed by the EIR preparers. Mitigation measures proposed by the project applicant are indicated as "proposed" in the Table 2.1, Summary Table.

The previous EIR evaluated 25 units on 14.48 acres as a "worst case scenario." Since the project has now been expanded to a Planned Unit Development (PUD) (25.62 acres), and annexation proposal (30.19 acres) including 46 units, the impacts and mitigation measures identified for the previous smaller proposal need to be reassessed, and this new EIR is being prepared. Under CEQA, the EIR is designed to assess the impacts of the largest project that could be constructed under the designated zoning for the area.

The Initial Study concluded that a Supplemental EIR (SEIR) was needed, since the project is now larger than the one evaluated in the previous EIR. The city planning staff later determined that a Subsequent EIR was more appropriate. A Subsequent EIR, which stands alone and requires no further reference to the previous EIR, is indicated if project or environmental conditions have substantially changed. The Notice of Preparation for the Subsequent EIR was dated March 30, 1992. This Subsequent EIR addresses General Plan Amendment and prezoning, annexation, a development agreement, design review, and a PUD (see Appendix B).

2. SUMMARY

2.1 SUMMARY OF IMPACTS AND PROPOSED MITIGATION MEASURES

This EIR examines the environmental impacts of the proposed Redwood Creek Village project. The proposed project is a request for annexation, application for prezoning and General Plan Amendment, design review and a proposed Planned Unit Development (PUD). The applicant has also requested that a Development Agreement be negotiated. The annexation request includes 30.19 acres of unincorporated Alameda County, and would include 25.62 acres owned by Michael P. Boyle; 2.45 acres owed by the East Bay Municipal Utilities District (EBMUD) and occupied by that agency's Madrone Reservoir; 1.72 acres owned by the Oakland Unified School District (OUSD) and occupied by a parking lot serving Skyline High School; and 0.40 acres of the Markley property on the east side of Balmoral Drive.

In 1987, the applicant proposed to annex 14.48 acres and to build 13 single-family dwellings on 10 of the acres. An EIR was prepared and certified by the City of Oakland Planning Commission on November 16, 1988. The City Council, however, did not certify the previous EIR nor approve the proposed 1987 project.

Identified project impacts and mitigation measures are summarized in Table 2.1-1. The significance of impacts, both before and after mitigation, is abbreviated as follows: (S) significant adverse impact and (LS) less-than-significant impact. Mitigation measures proposed by the applicant, rather than by the EIR preparers, are noted as "proposed" in the Summary Table. All significant impacts identified in this Draft EIR would be made less-than-significant with the implementation of the recommended mitigation measures.

2.2 ALTERNATIVES EVALUATED

The alternatives analysis (pp 5.1 ff.) included a No Project Alternative, a Reduced Magnitude and Alternate Design Project Alternative, and a Mitigated Project Alternative. Two alternative sites were also considered and found to have more impacts needing mitigation than the proposed project. The No Project Alternative would result in the fewest environmental impacts. The Reduced Magnitude and Alternative Design Alternative has been identified in this Draft EIR as the environmentally superior project alternative.

TABLE 2.1-1. SUMMARY OF POTENTIAL IMPACTS AND RECOMMENDED MITIGATION MEASURES

IMPACTS	MITIGATION MEASURES
4.1 LAND USE COMPATIBILITY AND POLICY CONFORMITY	
Will permanently remove acreage currently integrated in regional open space network from use as open space. The permanent removal of 25.67 acres of open space currently integrated into the network of regional open space from this use is a significant impact of the project that cannot be mitigated to less than significant levels. (S)	Include permanent conservation easements for the eastern portions of lots 33, 34, 35, 36, 37, 39, 40, and 42, and a portion of lot 31 south of the area proposed for development up to and including the homogeneous redwood grove, including trails through the area. Make the proposed picnic area and tot park public property available to both Redwood Village residents and the general public. (SU)
Gated access is incompatible with general plan provisions for accessible open space. (S)	Eliminate gated access feature. (NS)
Inconsistent with General Plan policy calling for conveniently located on-site usable open space. (S)	Create separate commonly held lot for the tot lot. Make site trails available to nearby residents, and provide for their maintenance by the Homeowners Association. (NS)
4.2 VISUAL AND DESIGN FACTORS	
The proposed project will change the visual character of a ridgeline. The existing wooded ridge and two wooded slopes above a developed residential area would be developed with residential structures thus modifying the skyline view from certain perspectives. The residences on lots 3, 4, 5, and 6 would be the most visible from Balmoral Drive,	All of the homes would be architecturally designed to fit into the natural contours of each lot. Natural colors and building materials, split level homes, and vegetative screening are proposed to allow the homes to blend into hillsides and vegetation. (proposed)

(S) = Significant (SU) = Significant and Unavoidable (NS) = Not Significant

(CONTINUED)

TABLE 2.1-1 (CONTINUED). SUMMARY OF POTENTIAL IMPACTS AND RECOMMENDED MITIGATION MEASURES

IMPACTS	MITIGATION MEASURES
especially from the intersection of Balmoral Drive, Bellwaver Way, and Shawnee Court due to the lack of screening vegetation and the nearness to Balmoral Drive. Lots 11 and 25 located on the southern knoll would also be visible once the entryway into the project site has been completed. This is a significant impact of the project that cannot be mitigated to less than significant levels. (S)	- Design of individual residences shall be scaled to site topography, vegetation, views and other lot specific elements as indicated in "Redwood Creek Village, March 16, 1993," filed with the City of Oakland Planning Department. - The most visible lots, 3, 4, 5, 6, 7, 8, and 9, shall be heavily landscaped along their western boundaries to screen the homes from adjacent properties. - Exterior building materials shall be fire resistant and natural in appearance, in order that the development blend with the site's natural setting. - The project applicant shall submit a landscape plan to the city for approval. The land-scape plan shall serve to soften the visual impacts of the development and shall utilize native drought tolerant and fire resistant vegetation. - Utility lines shall be undergrounded. (SU)
The project would utilize low to the ground street lighting where necessary thus reducing excessive nighttime glare from the project	- Exterior lighting shall be minimized. Lighting that is necessary should be of low profile design. Low pressure

(S) = Significant (SU) = Significant and Unavoidable (NS) = Not Significant

(CONTINUED)

TABLE 2.1-1 (CONTINUED). SUMMARY OF POTENTIAL IMPACTS AND RECOMMENDED MITIGATION MEASURES

IMPACTS	MITIGATION MEASURES
site. However, daytime glare from automobiles and window attributable to the development will make the site more visually noticeable. (S)	sodium vapor lamps should be used in the development. Reflective surfaces should be moderate and not used in large expanses in a single plane. Non-glare glass shall be used throughout the project to reduce intrusive glare. (NS)
<u>View Corridors</u>. Public views of the site from hiking, bicycling, and equestrian trails in Redwood Regional Park are not identified as significant. The distance of the site from the park and the limited number of views of the project site from the park makes the potential impacts of this development less-than-significant. (NS)	None are required.
Other views of the project site from Bellwaver Way, Shawnee Court, and Balmoral Drive would be noticeable. (S)	This remains as a significant unavoidable impact of the project. (S)
<u>City of Oakland General Plan</u>. The proposed project is found to be consistent with the General Plan policy requiring development to be related sensitively to the natural setting, with scale and intensity of development bearing a reasonable relationship to the physical characteristics of the site. However, this would only be the case if each of the residences will be designed by an architect for each lot, so that natural topography, views, and vegetation are taken into consideration in	Design review to ensure that the proposed guidelines are adhered to. (NS)
(S) = Significant (SU) = Significant and Unavoidable (NS) = Not Significant	

(CONTINUED)

IMPACTS	MITIGATION MEASURES
designing the floor plan, height, bulk, and setbacks, as proposed by the applicant. Should these design guidelines not be followed, significant impacts would result. (S)	
The proposed project would not be consistent with the General Plan requirement that every development of substantial size (in the hills) should reserve the most appropriate portions as permanent open space. (S)	A strip of land approximately 200 feet in width along the east side of the project site should be dedicated as a conservation easement which cannot be altered by property owners. The tot lot should be a separate parcel, owned and maintained by the Homeowners Association. This set aside should be at least 5,000 to 10,000 square feet in size. (NS)
<u>4.3 TRAFFIC, PARKING, AND CIRCULATION</u>	
The proposed on-site street system is not in conformance with standard engineering practices and the relevant policies of the City of Oakland. Several further mitigation measures are also needed. The current plan shows a 0% grade on some sections of the roadway which is not allowed, and sidewalks do not run along all roadways which is not in compliance with standard Oakland policy. (S)	The applicant should include sidewalks on all street segments or provide equivalent pathways for pedestrian access through the entire site. Streets shown in the plan at 0% grade shall be modified to at least a 0.5% grade. The type and location of regulatory and/or warning signs should conform to the standards set forth in the Uniform Manual and the CALTRANS Traffic Manual. The regulatory signs would be of primary concern; these would include stop and yield signs, one-
(S) = Significant (SU) = Significant and Unavoidable (NS) = Not Significant	

(CONTINUED)

TABLE 2.1-1 (CONTINUED). SUMMARY OF POTENTIAL IMPACTS AND RECOMMENDED MITIGATION MEASURES

IMPACTS	MITIGATION MEASURES
	way street signs, speed signs, and parking signs. A complete signing and pavement marking schedule should be compiled after the street and pedestrian system has been determined. A speed limit of 20 miles per hour is proposed for the project. Since the street system is private, this limit would not be enforced by the Oakland Police Department, but would be the responsibility of the Homeowners Association through the CC&Rs. The speed limit is reasonable since the proprietary concerns of the residents would probably be more effective than an occasional police presence and the identity of violators more readily determined. Where parallel parking is allowed on streets with steeper grades, vertical curbs should be installed to allow crimping of the wheels. A clear space behind the curbs should be provided for alighting passengers. Conversely, the median island curb on Entrance Road should use a mountable curb so that the island could become a part of the roadway section if required during an emergency. Provide additional sidewalks and trails, including pedestrian paths as sidewalks to the tot lot and connecting more of the several

(S) = Significant (SU) = Significant and Unavoidable (NS) = Not Significant

(CONTINUED)

TABLE 2.1-1 (CONTINUED). SUMMARY OF POTENTIAL IMPACTS AND RECOMMENDED MITIGATION MEASURES

IMPACTS	MITIGATION MEASURES
	residential areas, including Village Road and Village Loop. The locked gates should be removed from the project or if the community is gated, the gates should be equipped with an opening mechanism available to the public, such as a well marked button. (NS)
<u>4.4 GEOLOGY AND SOILS</u>	
<u>Topography and Slope Stability</u>. Completion of cutting, filling, or other site preparation actions without adherence to generally recognized geotechnical engineering principles could expose future residents to geologic hazards such as landslides or slope failure. This is identified as a potentially significant impact which can be mitigated through implementation of proposed mitigation measures below. (S)	A certified Geotechnical Engineer shall review the final grading plan, surface and subsurface drainage plans, and foundation plans for the proposed project. A final grading plan shall be submitted to the Office of Planning and Building and obtain the city's approval. The final grading plan should conform to all recommendations in the geotechnical and soils report. Grading permits will be issued only if the grading plan avoids slope stability concerns. A certified geologist shall be present on site during all phases of project grading, excavation, and pier and foundation wall installation to ensure that recommendations in the geotechnical report are adhered to. (NS)
Any improper grading of future	The proposed project shall be
(S) = Significant (SU) = Significant and Unavoidable (NS) = Not Significant	

(CONTINUED)

TABLE 2.1-1 (CONTINUED). SUMMARY OF POTENTIAL IMPACTS AND RECOMMENDED MITIGATION MEASURES

IMPACTS	MITIGATION MEASURES
lots leading to slope instability on the proposed project site would be identified as a significant adverse impact. (S)	required to follow the recommendations presented in Phase I (General) Soil / Geotechnical Report (1990) and Addendum Soil Report Slope Stability Analysis (1991) prepared for the project site by Globe Soil Engineers. Specific recommendations can be found in the Appendix and include the following: - Future lot owners intending to build homes on site should be required to prepare geotechnical reports separately for each home site during the design process, as indicated in the Phase I (General) Soil/Geotechnical Report (1990). - Foundation design and construction should be performed by an engineer and contractor, respectively, who have ample experience with hillside construction. (NS)
Seismology. Intense ground shaking at the site could result in severe structural damage. Design of grading plans that increase seismic hazards on site, or design of structures which cannot withstand the expected maximum credible earthquake, would be considered significant adverse impacts. (S)	The structures of the proposed project shall meet the standards of the Unified Building Code (UBC) adopted by the City of Oakland. The UBC standards ensure structural designs that can withstand the maximum expected ground acceleration. (NS)
Soils. Due to the presence of	The landscaping plan of the
(S) = Significant (SU) = Significant and Unavoidable (NS) = Not Significant	

(CONTINUED)

TABLE 2.1-1 (CONTINUED). SUMMARY OF POTENTIAL IMPACTS AND RECOMMENDED MITIGATION MEASURES

IMPACTS	MITIGATION MEASURES
very erodible soils on site, there is the potential for significant adverse impacts due to accelerated erosion particularly during the construction phase. Erosion impacts and mitigation measures are discussed fully in Section 3.5, "Hydrology/Drainage." (S)	proposed project shall be designed to reduce erosion and to cover areas of alteration of natural land forms as specified in the General Plan. The applicant shall be required to submit the landscaping plan to the city for approval. In addition, the Homeowners' Association shall ensure adequate maintenance of the landscaping. Please refer to Section 4.5, "Hydrology/Drainage" for complete discussion of erosion issues and mitigation measures relating to erosion impacts.
<u>4.5 HYDROLOGY</u>	
<u>Drainage</u>. Calculations according to drainage studies indicate that runoff from eight of the nine defined drainage areas would have no adverse hydraulic impact. The remaining drainage area (POC #1) would experience substantially increased flow velocity which could adversely impact existing storm drain infrastructure. (S)	The applicant's engineer should confirm that the existing 15 inch RCP pipe at Blythen Way complies with city requirements. If necessary, the applicant should modify this pipe to confirm with city flood control requirements. The proposed storm drain system requires the city's review and approval. Modifications of the drainage system, as recommended in subsequent mitigation measures, should be incorporated into the final drainage plan to be submitted for city approval. (NS)
Increased volume of runoff could significantly increase erosion in the long-term. Erosion could also be increased by changes in the existing drainage patterns on the site. Uncontrolled runoff that is	A site erosion control plan should be submitted to the City of Oakland and the East Bay Regional Park District for approval prior to commencement of any grading on the site. The erosion control

(S) = Significant (SU) = Significant and Unavoidable (NS) = Not Significant

(CONTINUED)

TABLE 2.1-1 (CONTINUED). SUMMARY OF POTENTIAL IMPACTS AND RECOMMENDED MITIGATION MEASURES

IMPACTS	MITIGATION MEASURES
diverted from its natural drainage course may create new drainage courses by eroding unvegetated soils. A project design that does not adequately control vegetation removal and potential erosion could result in substantial erosion. Construction and grading activities will temporarily bare soils on site which could significantly erode. Erosion could cause significant siltation downstream of the site. This would have significant impacts to habitats in Redwood Creek. Please refer to Section 4.6, "Biotic Resources," for discussion of impacts to stream habitats. Construction activities that result in erosion are identified as a significant adverse impact which can be mitigated. (S)	plan should be designed according to the guidelines of the Association of Bay Area Governments. Erosion control measures should include at a minimum: Grading and excavation activities should be performed on the site between April 15 and October 15. Vegetative clearing should be limited to areas where actual structures or infrastructure will be located. Strippings of vegetation and organic top soil during construction should be removed from the site or placed such that they will not create debris flow or erosion hazard. Temporary devices such as diversion dikes, hay bales, silt fences, and plastic sheets should be used to control runoff on exposed areas. Before grading and construction commences, sediment traps should be installed on the site at all points of entry into Redwood Creek. Sediment traps should be designed to contain any and all erosion that occurs on site before it enters the creek. Routine maintenance and cleaning of these facilities should be provided for during construction and also on a regular basis by
(S) = Significant (SU) = Significant and Unavoidable (NS) = Not Significant	

(CONTINUED)

TABLE 2.1-1 (CONTINUED). SUMMARY OF POTENTIAL IMPACTS AND RECOMMENDED MITIGATION MEASURES

IMPACTS	MITIGATION MEASURES
	the Homeowners Association. Bare areas should be mulched, planted with vegetation or treated with a straw and/or jute slope protection matting before the wet season begins. Recommended vegetation and erosion control measures identified in the Geotechnical Report and Geotechnical Addendum should be strictly followed and incorporated into the final erosion control plan to be approved by the city. To reduce the potential for storm water overflows, storm drains shall be maintained properly by cleaning debris from the drains annually prior to the rainy season. The applicant should develop plans, subject to city approval, for the long-term maintenance of project storm drains. The storm drainage system and landscaping of the proposed project shall be designed to reduce erosion by limiting bare areas and controlling runoff on exposed soil. All runoff should be controlled and directed away from exposed soils and into existing natural drainages or properly engineered drainages. Runoff directed into existing natural drainage courses shall
(S) = Significant (SU) = Significant and Unavoidable (NS) = Not Significant	

(CONTINUED)

TABLE 2.1-1 (CONTINUED). SUMMARY OF POTENTIAL IMPACTS AND RECOMMENDED MITIGATION MEASURES

IMPACTS	MITIGATION MEASURES
	be designed to dissipate concentrated flow to assure that scour of natural drainage swales does not occur. Energy dissipaters and rip-rap shall be maintained by the home-owner's association. Rip rap may also be required at outfalls to prevent erosion, not just at intake structures. However, rip rap should be avoided in Redwood Creek in order to avoid significant impacts to the riparian and stream biota. Individual home landscape designs shall be submitted to the city building department prior to approval. Native, drought resistant species that require a minimum of herbicides, pesticides, and fertilizers should be emphasized in landscape plans. The Homeowners Association shall ensure that future residents adequately maintain their landscape. Eave gutters and downspouts shall be installed to collect roof water runoff with outlet pipes from the downspouts directed to appropriate outlet locations. Energy dissipators shall be placed at storm drain outfalls to minimize erosion and scouring. Riprap should be provided at all intake structures.
(S) = Significant (SU) = Significant and Unavoidable (NS) = Not Significant	

(CONTINUED)

TABLE 2.1-1 (CONTINUED). SUMMARY OF POTENTIAL IMPACTS AND RECOMMENDED MITIGATION MEASURES

IMPACTS	MITIGATION MEASURES
	Permanent use of sediment traps shall be employed to contain sediments originating on the developed site before they enter Redwood Creek. The plan for the design and maintenance of these sediments traps should be included in the erosion control plan to be submitted to the city prior to commencement of construction activities on the site. Any paved surfaces overhanging unpaved slopes shall be engineered to prevent storm water from flowing off and creating new drainageways. All sheet flow should be directed to the storm drain system. (NS)
<u>Water Quality</u>. The proposed project could introduce other pollutants into the drainage system and Redwood Creek. The proposed project's drainage plan would allow storm runoff either to empty directly into the natural drainage swales or to street drainage systems which feed into Redwood Creek. Pollutants reaching Redwood Creek would potentially impact the sensitive aquatic ecosystem. Over time urban pollutants attributable to the project and cumulative pollutants could combine to have a long-term impact on Redwood Creek water quality resulting in loss of important aquatic species. This is a significant impact of the	A terraced cascade of vegetated retention ponds or other treatment technology to filer pollutants from storm water should be incorporated into the project's storm water system design. The ponds would allow site runoff to percolate into the soil and most metals and other organic constituents would be removed. The retention ponds should be designed to retain the amount of runoff expected from a 10-year storm event. The Department of Fish and Game, the Regional Water Quality Control Board (Region 2), and the City of Oakland should approve the design of the ponds or other technology and the plan for ongoing maintenance. A provision
(S) = Significant (SU) = Significant and Unavoidable (NS) = Not Significant	

(CONTINUED)

TABLE 2.1-1 (CONTINUED). SUMMARY OF POTENTIAL IMPACTS AND RECOMMENDED MITIGATION MEASURES

IMPACTS	MITIGATION MEASURES
project that cannot be mitigated to less than significnat levels. (S)	for responsibility for implementation of the maintenance plan should be included in the CC&Rs for the project. Oil separators shall be employed in all storm drainage conduits. The Homeowners Association should be responsible for annual, or more frequent, maintenance of all separators. The individual home designs should be designed with outdoor roofed car-ports that drain to the sanitary sewer system rather than the storm sewer system. They should be designed with berms or other structures to ensure that rainwater cannot enter and that water inside cannot flow out. These car pads should be provided with hoses and clearly labeled as the only place where cars are to be washed or other hazardous materials to be handled. This will reduce the risk of soap, motor oil or other hazardous materials reaching Redwood Creek. These places are not, however, intended for hazardous materials disposal. The project applicant will be required to obtain a construction storm water permit under the National Pollutant Discharge Elimination System (NPDES) permitting program. The permit should strictly regulate construction waste and disposal measures. Rinsing concrete truck chutes on
(S) = Significant (SU) = Significant and Unavoidable (NS) = Not Significant	

(CONTINUED)

TABLE 2.1-1 (CONTINUED). SUMMARY OF POTENTIAL IMPACTS AND RECOMMENDED MITIGATION MEASURES

IMPACTS	MITIGATION MEASURES
	site would be prohibited. Signs should be posted in construction areas indicating the ecological sensitivity of Redwood Creek. The Regional Water Quality Control Board (Region 2) will make the determination as to whether a general permit or individual permit will be required. A sand trap to filter pollutants from stormwater flows at POC #1 (and any other lined drainage) shall be constructed and maintained. All storm drains constructed as part of the proposed project should be labeled, either by stamping the concrete curb or by a posted sign, to indicate that the drain flows into Redwood Creek which supports sensitive wildlife species, including steelhead rainbow trout. The sign should indicate, if possible, that only clean storm water should enter the drain and that disposing of, or allowing runoff to carry, silt, household hazardous chemicals such as paint, or any oils or soap, etc. into the drains is prohibited. The Homeowners Association should educate residents about the sensitivity of the creek and encourage minimizing the use of pollutants, especially harmful pesticides. (SU)
(S) = Significant (SU) = Significant and Unavoidable (NS) = Not Significant	

(CONTINUED)

TABLE 2.1-1 (CONTINUED). SUMMARY OF POTENTIAL IMPACTS AND RECOMMENDED MITIGATION MEASURES

IMPACTS	MITIGATION MEASURES
Unless strict landscape water conservation measures are implemented, the proposed project will reduce water supplies. (S)	Landscape Water Conservation Requirements of the East Bay Municipal Utility District (EBMUD), found in Appendix F of this document, shall be followed. The City of Oakland's Drought Tolerant Landscaping Ordinance (to be adopted) will also need to be followed. (NS)
<u>City of Oakland General Plan</u>. The proposed project would be in conflict with the General Plan policy requiring development immediately adjacent to any stream to be designed to ensure that water quality is not significantly affected. As discussed above, both erosion and pollutant releases have the potential to significantly adversely affect water quality in Redwood Creek. (S)	See recommended Mitigation Measures above. Because significant impacts to the water quality in the creek are expected to remain after mitigations, this policy non-conformity will remain as a significant unavoidable impact of this project. (SU)
<u>4.6 BIOTIC RESOURCES</u>	
According to a tree survey conducted by the applicant, 120 trees will need to be removed for the proposed project roadways. Of the 120 trees 94 are native species, including 73 redwoods, 17 oaks, 3 California bays and 1 madrone. Tree removal will also be necessary in order to create building sites. An additional 112 trees are subject to removal as a result of the placement of residences and associated driveways, including 48 redwoods, 44 oaks, 8 California bays, 6	The applicant has submitted an application for a tree removal permit for trees designated for removal due to project road construction. City regulations will require replacement plantings on site or a combination of replacement plantings and in lieu fees for the 232 native trees proposed for removal, if removal permits are granted. Replacement trees would take several decades to grow to maturity.
(S) = Significant (SU) = Significant and Unavoidable (NS) = Not Significant	

(CONTINUED)

TABLE 2.1-1 (CONTINUED). SUMMARY OF POTENTIAL IMPACTS AND RECOMMENDED MITIGATION MEASURES

IMPACTS	MITIGATION MEASURES
madrones, 2 pines, 3 sequoia gigantia, and 1 cedar. (S)	Lot lines and building footprints within the lots should be designed to avoid the removal of existing mature native trees, wherever possible, as the applicant's plan appears to do. Specifically lots 28, 41, 1, and 2 should not be built on to save significant trees. Also the portion of Village Loop Road and going toward Swing Place should not be constructed in order to save three oaks that are significant individual specimens. Without a redesign of the project, including this reduction in scale, the removal of trees remains a significant unavoidable impact of this development. (SU)
The vegetation that would be preserved in the development could be indirectly damaged by construction activities and related changes in the local ecology. Grading and construction activities can have detrimental effects on vegetation by directly destroying roots, compacting soils, causing excavated materials to accumulate within the dripline of trees and producing dust which settles on leaves and needles of adjacent trees, shrubs, and other vegetation. (S)	The machinery, earthen or stockpiled materials produced or used during the construction of water system, storm drainage, buildings, and roadways shall be kept away from the driplines of trees, vegetated areas, and drainage areas, and if trees or vegetation are damaged, they shall be replaced. (NS)
Future residents of the project site may introduce exotic plant species which could displace native vegetation and alter the microclimate	Vegetation removed as a result of project activities shall be re-placed with native or naturalized species that are of value to local wildlife, and native vegetation

(S) = Significant (SU) = Significant and Unavoidable (NS) = Not Significant

(CONTINUED)

TABLE 2.1-1 (CONTINUED). SUMMARY OF POTENTIAL IMPACTS AND RECOMMENDED MITIGATION MEASURES

IMPACTS	MITIGATION MEASURES
inherent to the woodland community. (S)	shall be retained wherever possible. Native plants are generally more valuable as wildlife food sources and require less irrigation, fertilizers, pesticides, and herbicides than introduced species. A detailed landscaping plan will be required to be submitted to the city for approval. Homeowners should be required to landscape with native drought tolerant vegetation. Existing native vegetation in the eastern portion of the lots should not be removed unless part of an approved fire safety program. This requirement should be included in the covenants, codes and restrictions of the Homeowners Association. (NS)
The removal of 120 trees for road construction and the removal of an additional 112 trees for the establishment of building sites on the project site will modify wildlife habitat. Remaining wooded areas near project roadways and wooded areas adjacent to lots proposed for development will be less valuable as wildlife habitat due to the increase in human activities on the site during construction and after project buildout. The proposed project preserves large tracts of wooded acreage in the eastern portion of the site. More reclusive species would be expected to relocate to undisturbed areas. (S)	Construction activities shall be as limited in areal extent as is feasible to minimize wildlife habitat disturbance. Temporary fence shall be erected between construction sites and designated open space areas to protect the vegetation from being trampled by human traffic and equipment access and storage. (NS)
(S) = Significant (SU) = Significant and Unavoidable (NS) = Not Significant	

(CONTINUED)

TABLE 2.1-1 (CONTINUED). SUMMARY OF POTENTIAL IMPACTS AND RECOMMENDED MITIGATION MEASURES

IMPACTS	MITIGATION MEASURES
Fencing at lot lines would be detrimental to movement of some species of wildlife. (S)	Fencing at lot lines should not be permitted in the conservation area and discouraged elsewhere, so as not to disrupt wildlife movement. Residents should be prohibited from allowing household cats to roam at night, and all cats should be required to wear bells. These prohibitions should be stated in the project's CC&Rs. (NS)
The project has the potential to have significant short-term and long-term impacts on the native population of steelhead rainbow trout that use the west branch of Redwood Creek for spawning habitat. In the short-term, the construction of the project may lead to siltation of the creek, and the smothering of spawning gravels with mud. Runoff from the site attributable to the project will drain into the creek and will include urban pollutants such as oil, grease, soap suds, antifreeze, rubber particulates, fertilizers, herbicides, and pesticides, which would adversely affect water quality in the creek. (S)	Grading and construction activities shall be prohibited on the site between October 15 and April 15. An erosion control plan shall be designed pursuant to the guidelines of the Association of Bay Area Governments. This erosion control plan should be reviewed by the East Bay Regional Park's Fisheries Department in addition to the City Public Works Department and the California State Department of Fish and Game. Grease traps and sediment catchment basins shall be installed to capture runoff from impervious areas such as parking lots and roadways, minimizing pollutants entering Redwood Creek. A terraced cascade of vegetated retention ponds, sand filter, or other treatment technology to filter pollutants from storm water should be incorporated into the
(S) = Significant (SU) = Significant and Unavoidable (NS) = Not Significant	

(CONTINUED)

TABLE 2.1-1 (CONTINUED). SUMMARY OF POTENTIAL IMPACTS AND RECOMMENDED MITIGATION MEASURES

IMPACTS	MITIGATION MEASURES
	project's storm water system design at point of concentration Number 1 (P.O.C. #1) in order to minimize stream pollution. The ponds would allow site runoff to percolate into the soil and most metals and other organic constituents would be taken up by the vegetation. The retention ponds should be designed to retain the amount of runoff expected from a 10-year storm event. The Department of Fish and Game, the Regional Water Quality Control Board (Region 2), and the City of Oakland should approve the design of the ponds or other technology and the plan for ongoing maintenance. A provision for responsibility for implementation of the maintenance plan should be included in the CC&Rs for the project. Also, to reduce the buildup of numerous contaminants on paved surfaces, a program of regularly sweeping driveways and streets shall be included in the CC&Rs. Cleaning of streets and driveways by power flushing would be specifically prohibited. All mitigation measures in Section 4.5, "Hydrology, Storm Drainage and Water Quality" regarding preservation of water quality and reduction of erosion shall be implemented. (SU)
4.7 UTILITIES AND PUBLIC SERVICES	

(S) = Significant (SU) = Significant and Unavoidable (NS) = Not Significant

(CONTINUED)

TABLE 2.1-1 (CONTINUED). SUMMARY OF POTENTIAL IMPACTS AND RECOMMENDED MITIGATION MEASURES

IMPACTS	MITIGATION MEASURES
<u>Fire Protection Services</u>. The proposed project would increase the demand for fire protection services in the City of Oakland. The location of the project site on the wildland/urban interface leaves this site within an area of extreme fire hazard. Improper project design would create significant problems for the City of Oakland Fire Department. (S)	The gated feature of the plan should be eliminated or a system of emergency access devised which has the approval of fire, police, and ambulance agencies. The developer should do one of the following: - Alter the proposed project to allow for an open entrance, not a gated entrance; or - Submit a proposal for a gated access override system to the Fire Chief and the Chief of Police for approval. The gated feature of the project will require specific city review and approval. The project will be covered by the newly adopted requirements in the Oakland Building Code for special code provisions of the "Hazardous Fire Zone." This project will be located in the hazardous fire zone and buildings must comply with fire-resistive construction requirements, such as the prohibition of cave vents, class A roofs, special siding protection, etc. Hydrants must be within 150 feet of the farthest part of the building, measured as the hose would lay. Fire flows required for the proposed project are 1,500 gallons per minute (gpm) at 20 pounds per square inch (psi). Fire flows of 1,000 gpm would be adequate if all structures are

(S) = Significant (SU) = Significant and Unavoidable (NS) = Not Significant

(CONTINUED)

TABLE 2.1-1 (CONTINUED). SUMMARY OF POTENTIAL IMPACTS AND RECOMMENDED MITIGATION MEASURES

IMPACTS	MITIGATION MEASURES
	equipped with sprinklers to at least Oakland Level II. Hydrants on dead-end streets must be no more than 150 feet from the dead end. All project roadways shall conform to city standards. Class "A" roofs are required because the project site is in a potentially critical fire area. Roofs rated Class A include clay tiles, concrete tiles, fiberglass shingles, metal tiles, and perlite shakes. If sprinklers are not installed, structures three or more stories high shall have a secondary exit that leads to the street and a secondary access to the third story. Structures four or more stories high must be equipped with sprinklers. A fuels management safety zone shall be cleared from each structure for a distance of not less than 30 feet. No limbs or overhanging branches should be near any structures. The homes shall have inter-connected smoke detectors. Stucco exterior or one-hour rating construction or exterior walls of
(S) = Significant (SU) = Significant and Unavoidable (NS) = Not Significant	

(CONTINUED)

IMPACTS	MITIGATION MEASURES
	residences to minimize fire hazards. Screens over outlets of every chimney or stovepipe that is attached to any fire place, stove, or other device that burns any solid or liquid fuel shall be provided and maintained at all times. Screens should be constructed of non-flammable material with openings of not more than one-half inch in size. Addresses easily read from the street shall be posted on each residence. Project landscaping shall consist predominantly of native, drought tolerant, and fire resistive plants. Fire and Building Codes are being strengthened due to the Oakland Hills fire in October of 1991. The proposed development shall conform to Fire and Building Codes in effect when building permits are issued, unless a Development Agreement is entered into which stipulates otherwise. (NS)
Police Protection. In order to avoid a significant impact on police protection services, the applicant should implement certain measures recommended by the Police Department. (S)	All residences shall display a clearly visible address, no less than six inches in height. All exterior doors, and doors leading to the interior from the garage shall be one and three-fourths inches thick solid core in
(S) = Significant (SU) = Significant and Unavoidable (NS) = Not Significant	

(CONTINUED)

TABLE 2.1-1 (CONTINUED). SUMMARY OF POTENTIAL IMPACTS AND RECOMMENDED MITIGATION MEASURES

IMPACTS	MITIGATION MEASURES
	construction. All exterior doors shall be equipped with the following: - One inch deadbolt locks, twin cylinder with key retaining feature on main entry door. - 190 degree optical viewer, front door only. - Maximum security strike plates on all deadbolt locks. - Non-removable hinge pins on all exterior doors. The developer shall submit site plans, hardware specifications and a construction crime prevention plan to the Chief of Police for approval. In order to mitigate impacts to emergency police and fire services and emergency services to the site, the developer shall do one of the following: * Alter the proposed project by providing open access to the site. * Submit a proposal for an access override system to the Chief of Police, the Fire Chief, and the Alameda County Department of Emergency Services for approval. (NS)
(S) = Significant (SU) = Significant and Unavoidable (NS) = Not Significant	

(CONTINUED)

TABLE 2.1-1 (CONTINUED). SUMMARY OF POTENTIAL IMPACTS AND RECOMMENDED MITIGATION MEASURES

IMPACTS	MITIGATION MEASURES
Solid Waste Disposal. The proposed project would not significantly increase the demand for solid waste disposal services. The Oakland Scavenger Company anticipates no problems in providing collection and disposal services to the proposed project. However, in order to preserve remaining disposal capacity at the Altamond Landfill, recycling is strong encouraged. (NS)	A curbside recycling program or an on-site recycling center shall be incorporated into the project. Information shall be provided by the Homeowners Association to residents about the recycling services, buy back centers, and possible markets for recyclables in the area. Homeowners should be encouraged to recycle glass, metal, cardboard and other materials to the maximum extent feasible. Insulation and other products made of recycled materials may be used in the construction of development structures. Develop and implement a program to recycle construction debris. (NS)
Wastewater Services. The amount of sewage that would be generated as a result of the proposed project, approximately 11,340 gallons per day (gpd), is not likely to significantly impact wastewater services currently provided to the City of Oakland. (NS)	The project engineer should submit the plans for on-site sewer lines to the City of Oakland, Office of Planning and Building, Development Services, for approval.
Water Services. Based on the estimated water use of 270 gpd per single-family residential unit in the project area, the proposed development of 42 single-family units would generate an increase in demand of approximately 11,340	Water conservation devices such as low flow shower heads and toilets shall be incorporated into the design of the proposed project in order to mitigate cumulative impacts.
(S) = Significant (SU) = Significant and Unavoidable (NS) = Not Significant	

(CONTINUED)

TABLE 2.1-1 (CONTINUED). SUMMARY OF POTENTIAL IMPACTS AND RECOMMENDED MITIGATION MEASURES

IMPACTS	MITIGATION MEASURES
gpd. The project itself will not create a significant impact on the current water supply available to the City of Oakland, but will contribute to a cumulative impact on water demand. (S)	Landscaping shall consist of native and drought tolerant vegetation which requires less water. The Drought Tolerant Vegetation Ordinance in the City of Oakland shall be complied with. Landscaping shall be drip irrigated. (NS)
<u>Parks and Recreation</u>. There are insufficient local playground facilities in the project area to provide school age children adequate areas for outdoor play. (S)	The proposed project shall include the dedication of approximately 5,000 to 10,000 square feet of open space area to be improved with playground facilities such as swings and slides, in order to provide recreation facilities for children of project site homes. The exact size of land to be dedicated shall be determined through coordination with the City of Oakland Department of Parks and Recreation. This dedication would not be an addition to the city's current Parks and Open Space System, but would provide adequate recreational space for future residents of the proposed project. Pedestrian access should be provided, most likely between lots 21 and 44. (NS)
<u>4.8 NOISE</u>	
Project construction will create temporary high level noise impacts. (S)	Muffle vehicles and equipment; limit construction hours; inform the public of construction timelines. (NS)
(S) = Significant (SU) = Significant and Unavoidable (NS) = Not Significant	

(CONTINUED)

TABLE 2.1-1 (CONTINUED). SUMMARY OF POTENTIAL IMPACTS AND RECOMMENDED MITIGATION MEASURES

IMPACTS	MITIGATION MEASURES
Some noise will occur at the site as a result of automobile alarm malfunctions and automobile traffic in the parking lot of the Skyline High School. (S)	Install an appropriate sound barrier along the project site/ Skyline High School boundary. (NS)
(S) = Significant (SU) = Significant and Unavoidable (NS) = Not Significant	

3. PROJECT DESCRIPTION

3.1 RESPONSIBLE OR POTENTIALLY AFFECTED AGENCIES

This EIR will be used to provide the environmental review for the Redwood Creek Village project. It is intended to provide to the Lead Agency, responsible local, regional, state and federal agencies, and to the general public sufficient information to enable them to evaluate the environmental impacts of the proposed project. The organizations described below are identified as having a responsibility or a particular interest in the impacts of the proposed project.

Local Agencies

THE CITY OF OAKLAND. As lead agency, the city has the broadest oversight and review authority for the project. The City Planning Commission will be required to decide on the General Plan Amendment and prezoning, the annexation, and the Development Agreement and refer them to the City Council for final determination. The Planning Commission will also make the determination on the PUD and the design review for the site. The Office of Planning and Building will issue building, grading, landscaping and other permits needed for actual construction. Other city departments also have review authority and will either make recommendations to the Office of Planning and Building decisions or issue their own permits, as required.

THE COUNTY OF ALAMEDA. The County of Alameda will review and make recommendations on the annexation decision.

Regional Agencies

EAST BAY MUNICIPAL UTILITY DISTRICT (EBMUD). Water supply and sewage treatment facilities would be provided to the project site under the proposed project by EBMUD. The proposed project site will need to be annexed into the EBMUD service area if it is annexed into the city. EBMUD will approve or disapprove this annexation.

EAST BAY REGIONAL PARKS DISTRICT. Regional Park lands border the project site on the east, and are not far distant on the west and north. Run-off, views, and wildlife may affect park lands. The Regional Park district will review and comment as a responsible agency.

SAN FRANCISCO REGIONAL WATER QUALITY CONTROL BOARD. The San Francisco Bay Regional Water Quality Control Board (SFRWQCB) is a state agency which regulates surface and groundwater quality in the San Francisco Bay region. The San Francisco Bay region comprises all of the San Francisco Bay segments extending to the mouth of the Sacramento-San Joaquin Delta (Winter Island near Pittsburg) and includes all or major portions of nine Bay Area counties. SFRWQCB administers state and federal water policy in the region, and is directed to provide protection of beneficial uses and enhancement of water quality. Board activities include:

- Addressing regionwide water quality concerns through the creation and triennial update of a Water Quality Control Plan (Basin Plan) which specifies beneficial uses of waters, water quality objectives to protect uses, and strategies and schedules for achieving objectives.

- Permitting of waste discharges and enforcing requirements under the state Porter-Cologne Water Quality Act and the federal NPDES program.

- Implementing pollutant and pollutant effects monitoring programs on a regional and local basis.

- Developing and implementing pollution control programs for urban runoff.

COUNTY OF ALAMEDA LOCAL AGENCY FORMATION COMMISSION. The Local Agency Formation Commission (LAFCO) is a Responsible Agency under CEQA, as it must approve or deny the proposed annexation.

ASSOCIATION OF BAY AREA GOVERNMENTS. The Association of Bay Area Governments (ABAG) is a comprehensive regional planning agency working to help solve problems in areas such as environmental quality, housing, transportation, and economic development. Owned and operated by the 100 cities and counties of the San Francisco Bay Area, ABAG was established to protect local control, promote cooperation, and provide a regional forum for planning issues. They will act as a clearinghouse to ensure all responsible agencies are given the opportunity to review the project.

State Agencies

CALIFORNIA DEPARTMENT OF FISH AND GAME. The California Department of Fish and Game (CDFG) is responsible for the preservation, protection, and management of California's fish, game, and native plants without respect to their economic value. CDFG seeks preservation of the state's wildlife resources through the protection of habitat and of the species themselves. Departmental activities include:

- Enforcing hunting and fishing laws and regulations, including the issuance of permits for these activities.

- Conserving and acquiring of land, water, and water rights to ensure ecological preserves and fish and game propagation.

- Reviewing permit applications of the U.S. Army Corps of Engineers, State Water Resources Control Board, State Reclamation Board, and San Francisco Bay Conservation and Development Commission.

- Collecting and maintaining data on fish and wildlife and their habitats, as well as inventories of rare and threatened native species.

- Reviewing and commenting on mitigation activities for federal and state water resource development projects.

- Reviewing development proposals for compliance with the National Environmental Protection Act, the California Environmental Quality Act, federal and state Endangered Species Acts, and other environmental protection laws.

Federal Agencies

U.S. FISH AND WILDLIFE SERVICE. The mission of U.S. Fish and Wildlife Service (USFWS) is to conserve, protect, and enhance fish and wildlife, and their habitats, throughout the nation. The San Francisco Estuary lies in USFWS Region One, where the agency is responsible for all wildlife except marine mammals. Activities include:

- Reviewing and commenting on all water resource development projects, their impacts on fish and wildlife, and mitigation and enhancement thereof.

- Providing technical assistance on wildlife management to state, local and federal agencies as well as to private industry.

- Ensuring compliance with the National Environmental Protection Act (NEPA) in preparation of Environmental Impact Statements.

- Enforcing the Endangered Species Act, with specific responsibilities for non-marine species, and enforcing other federal fish and wildlife laws.

- Acquiring wetlands, fishery habitats, bird refuges and waterfowl nesting lands for preservation and or restoration; and managing National Wildlife Refuges (3 on San Francisco Estuary and 10 in watershed) and National Fish Hatcheries.

- Monitoring and addressing problems with environmental contaminants.

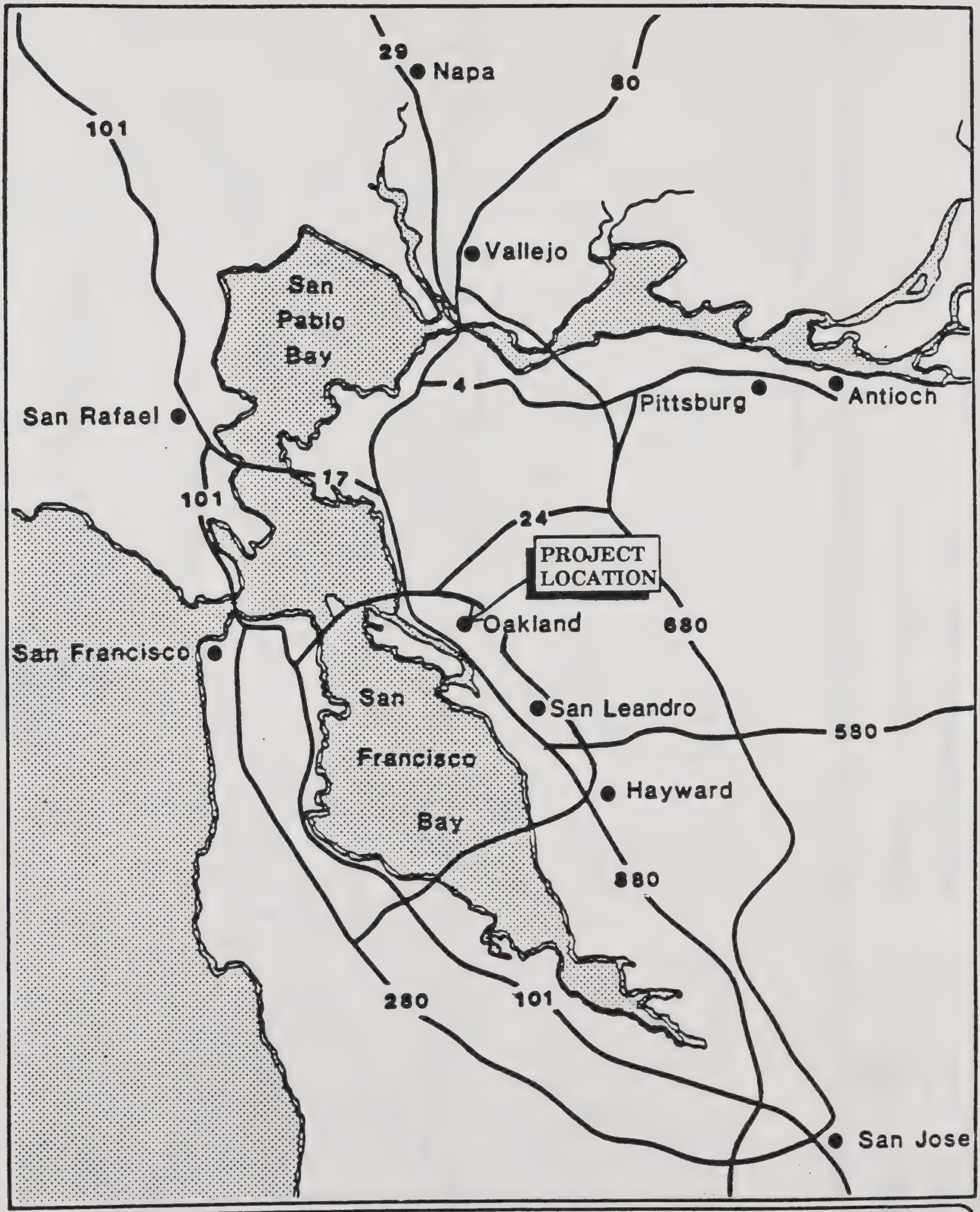
3.2 PROJECT SITE LOCATION AND CHARACTERISTICS

Site Location and Boundaries

The project site is located in the Oakland Hills, approximately seven miles southeast of downtown Oakland and currently within unincorporated Alameda County (see Figure 3-1 and 3-2). It is east of Balmoral Drive, north of Skyline High School, southeast of Blythen Way and west of the Anthony Chabot Regional Park. The property is bordered on three sides by the City of Oakland and on the fourth by the Regional Park. Access to the site is through the city, principally from Balmoral Drive. Existing access to the project site is from City of Oakland streets, from 5700 to 5720 Balmoral Drive, and from the southeasterly end of Blythen Way.

The project site is currently within unincorporated Alameda County. The 25.6 acre Boyle property consists of seven parcels, three of which are zoned A-B-E (100) and four of which are zoned PD (see Figure 3-3). Parcels 85-101-79-3, 85-102-19, and 85-102-22 are zoned A-B-E (100) and comprise about one half of the acreage. A-B-E (100) stands for Agricultural, Building Site Area as Specified (in this instance 100 acres).

Parcels 85-101-114-2, 85-102-18-7 and -8, and 85-102-20 are zoned PD as of 1989 (Ordinance No. 0-89-45, included in this report as Appendix H). The current limits to development are represented by the current buildings on the

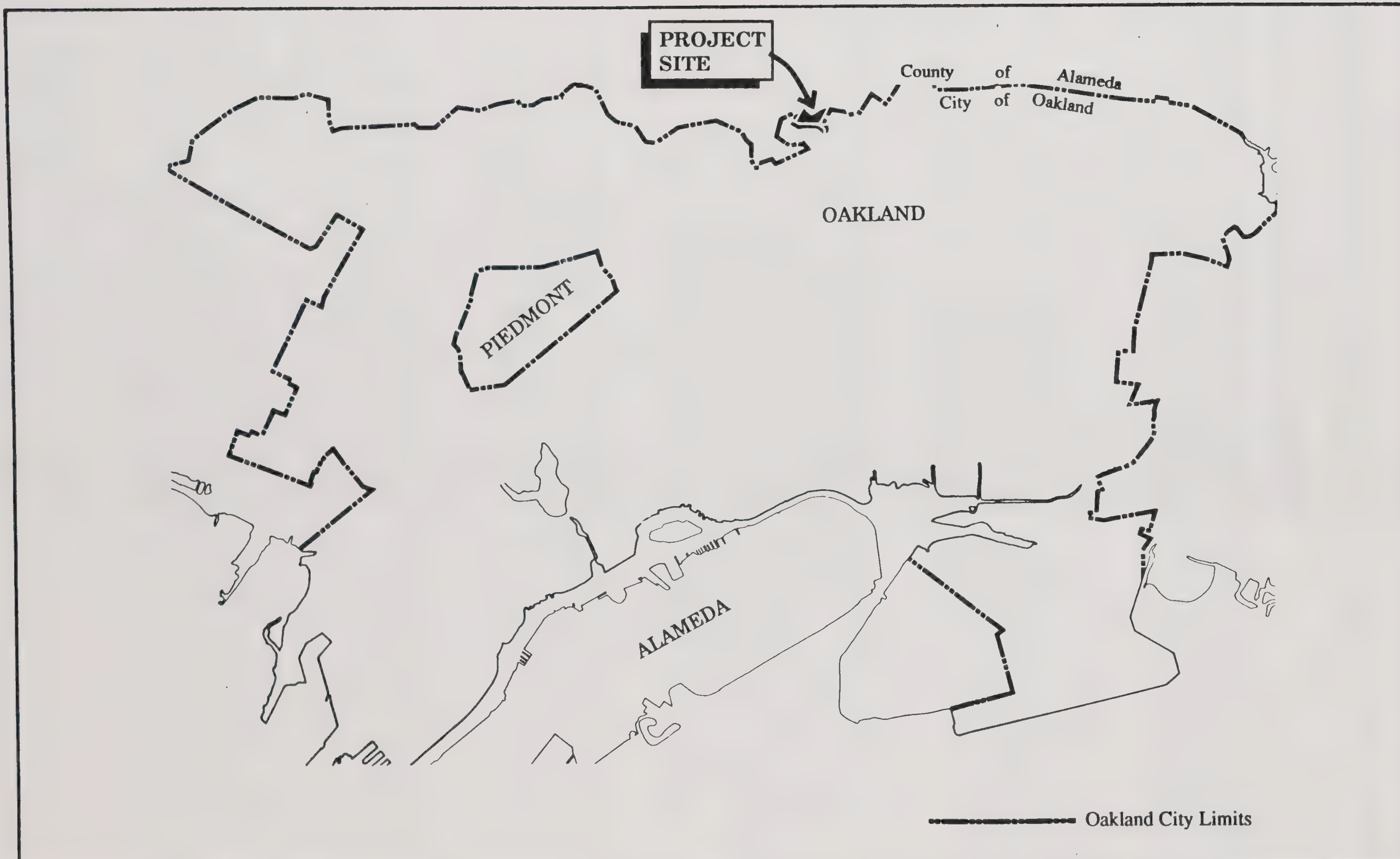


earth metrics

SCALE

FIGURE 3-1 REGIONAL PROJECT LOCATION

Source: CERTIFIED/Earth Metrics, 1992



earth metrics

SCALE
no scale

FIGURE 3-2 LOCAL PROJECT LOCATION

Source: CERTIFIED/Earth Metrics, 1992

property plus two primary and one secondary housing unit. The proposed project could not be constructed under current county zoning.

3.3 PROJECT BACKGROUND AND DESCRIPTION

Background. In 1987 the applicant proposed to annex 14.48 acres and build 13 single family dwellings on the 10 acres, which are zoned PD in the middle of the current 25.6 acres. An Environmental Impact Report was prepared and certified by the City of Oakland Planning Commission on November 16, 1988. The City Council, however, did not certify the previous EIR nor approve the proposed 1987 project.

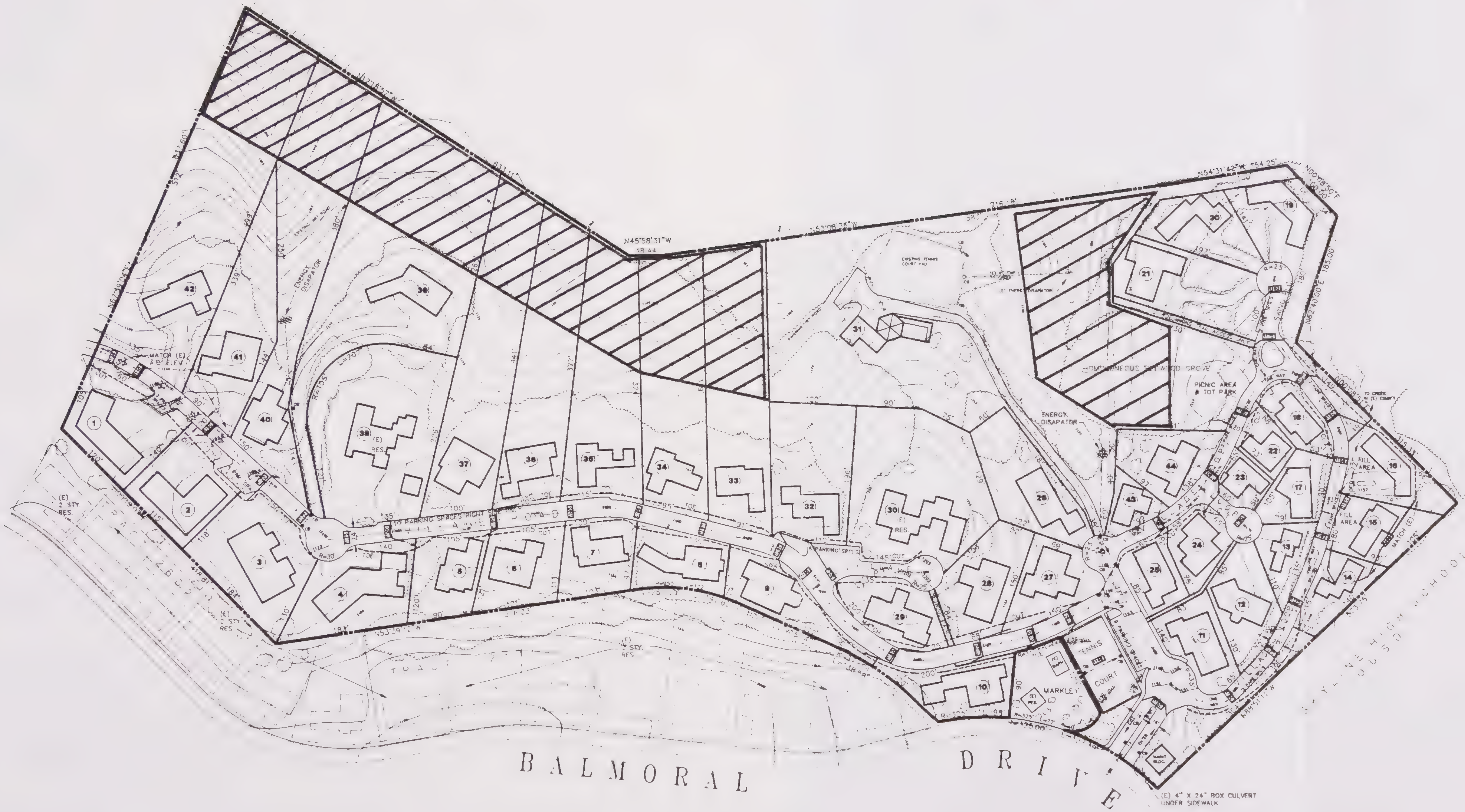
The previous EIR evaluated 25 units on 14.48 acres as a "worst case scenario." Since the project has now been expanded to a PUD of 41 new units on 25.62 acres, and an annexation proposal which includes 30.19 acres and 46 dwelling units, the impacts and mitigation measures identified for the previous smaller proposal need to be reassessed and this new EIR is being prepared. Under CEQA the EIR is designed to assess the impacts of the largest project that could be constructed under the designated zoning for the area.

Description. The proposed project is a request for annexation, application for prezoning and General Plan Amendment, and a proposed Planned Unit Development (PUD). The annexation request includes 30.19 acres of unincorporated Alameda County, and would include 25.62 acres owned by Michael P. Boyle; 2.45 acres owned by the East Bay Municipal Utilities District (EBMUD) and occupied by that agency's Madrone Reservoir; 1.72 acres owned by the Oakland Unified School District (OUSD) and occupied by a parking lot serving Skyline High School; and 0.40 acres of the Markley property on the east side of Balmoral Drive. The annexation petition may proceed in either of two ways. The applicant may petition LAFCO directly, or he may petition the City of Oakland.

The application for a General Plan Amendment and prezoning also involves all of the 30.19 acres. The General Plan Amendment would incorporate the land into the City of Oakland. The 26.02 residential acres (25.62 + 0.40) would be designated Suburban Residential, and the 4.17 acres owned by EBMUD and OUSD would be designated Institutional or Governmental on the illustrative future Land Use Map.

The prezoning request is for an R-10, Estate Residential Zone, which requires a minimum lot size of 25,000 square feet. The 25.62 acres would allow for a maximum of 45 dwelling units. The R-10 zone is "intended to create, preserve, and enhance areas for single-family estate living at very low densities in spacious environments, and is typically appropriate to portions of the Oakland hill area" (City of Oakland Zoning Regulations, Sections 3250 - 3255).

The project is also a proposed PUD for the 25.62 acre Boyle property (see Figure 3-3). There are currently two homes on the site (#30 and #38). In addition, the applicant has already received county approval for the construction of two additional houses (#26 and #31). Including the existing and previously approved dwellings, the project site at full buildout would contain 44 single-family detached houses, one caretakers apartment over the



Conservation Easement (Mitigation Measure)

SCALE

1.25" = 200'

FIGURE 3-3 SITE PLAN

Source: Boyle Construction Company, 1992

maintenance shed, and the Markley property residence, for a total of 46 dwelling units.

Approximately 8 percent of the site would be covered with buildings and another 10 percent by roadways and roadway/rights of way. Both net and gross densities are 1.76 units per acre. 178 parking spaces are planned, 118 of which would be enclosed. The parking ratio would be approximately 3.8 spaces per dwelling unit. Garages for the intended vehicles would have a minimum of two spaces and approximately a third of the residences would have three enclosed spaces.

The applicant plans that the residential units would be custom designed single-family detached homes, two or three-stories in height and designed to blend with the natural topography. Split level structures would also be considered where appropriate. The custom designed homes would conform to the identified building envelope. The market value of the homes would be from slightly below $500,000 and approach $1,000,000.

Streets of the development would be private. The main entrance would be at the southwest corner of the property, from Balmoral Drive. Once inside the property, the motorist would turn either to the right or left onto a circular drive (Village Loop Road) servicing lots 11-25 and lots 43 and 44, or make a second left turn to follow Village Road in a northwesterly direction which would service lots 1-10 and 26-43. Planned common areas include a tennis court near the project entrance and a picnic area and tot lot off Village Loop Road and in an area of redwood trees.

The 46 dwelling units would range in size from just under 2,000 square feet to approximately 4,000 square feet in size. The southern portion of the project site would be built to a slightly higher density with smaller sites and more compact homes under 2,000 square feet. The average lot size would be about 21,780 square feet, and lots would range in size from 5,445 square feet (e.g., lots 22, 23 and 43) to about three acres (the applicant's own home site, lot 31), with two other lots over one acre in size (lots 39 and 42). Thirty-two of the 46 lots would be less than 25,000 square feet in size. Table 3.1-1 shows the various lot sizes.

Low level street lighting would be incorporated in the roadway plan. Accent plantings and benches would be placed along footpaths and trails. Landscape improvements to the common areas would be installed by the applicant and maintained by the proposed homeowners association. A detailed landscaping plan would be included in the final PUD review process. As they are developed, siting plans for each individual dwelling unit would undergo design review for consistency with the final PUD plans and conditions of approval.

An unstaffed entry gate, located at the divided access/egress turning circle, would include a visitor call box and remote access control operated from each residence and the maintenance building. The entry and exit gates would be activated automatically by entering residents and by all exiting vehicles. This feature will require specific city approval, which has not yet been granted.

TABLE 3.3-1. LOT SIZES

PROPOSED LOTS [1,2]	SIZE IN SQUARE FEET [3]
1	23,080
2	17,667
3	23,250
4	19,500
5	13,375
6	12,250
7	11,200
8	12,800
9	18,900
10	13,675
11	15,600
12	11,050
13	5,400
14	7,600
15	11,050
16	10,575
17	7,800
18	14,700
19	17,440
20	14,100
21	24,000
22	4,700
23	5,300
24	8,100
25	10,000
26	26,000
27	13,600
28	14,500
29	18,600
30	37,400
31	187,250
32	24,360
33	37,350
34	33,060
35	38,100
36	34,000
37	38,400
38	42,440
39	57,500
40	45,570
41	51,480
42	62,230
43	6,550
44	10,490
45	7,200 (Maintenance/Caretaker Facility)[4]

(CONTINUED)

TABLE 3.3-1 (CONTINUED). LOT SIZES

[1] Approximately 1.4 acres not included above are in the entry area roads and tennis court and miscellaneous easements.

[2] Note: The Markely parcel, already a separate property, is approximately 10,000 s.f.

[3] The above listed land, along with the Mardone reservoir site of EBMUD, and a portion of the Skyline High School lands, all combined, make-up the approximate 30.3 Acres of the Boyle Annexation.

[4] The maintenance/caretaker apartment may be considered a special accessory structure essential to the operation of the planned unit development, and not a residential structure.

Source: Applicant

The Preliminary Planned Unit Development drawing (see Figure 3-3) shows footprints of dwelling units in a schematic manner. Several "prototypicals" provided by the applicant (see Appendix L) are provided to assist in conceptualizing the appearance of the development. PUD approval of "envelopes" is on the basis of prototypicals provided by the applicant. Site by site design review would be conducted for conformance with the approved envelopes. Buildout of the development would be expected to be completed by the year 1999.

Plans for project phasing include development of the most northerly 10 acres first (Phase I). This phase would involve 15 home sites with initial access from the end of Blythen Way. Water and sewer would be provided from Blythen Way. Homes would be individually designed for buyers consistent with PUD approvals, if granted. Boyle Construction Company would perform all construction of improvements and new residences. Electric, gas, cable TV, and phone are all available at Blythen Way. Excavated materials would be placed as compacted fill at the same locations with the haul route on site via a temporary haul road between Station 0+00 and approximately 8+00 of Village Road with a link to the existing Loop Road routing to the most southern fill area. The existing gate presently at the end of Blythen Way would be removed and Village Way would be widened as per the proposed plan. The connecting haul route would provide a ready emergency egress to Balmoral Drive near the proposed entrance/egress at 5700 Balmoral Drive. The associated tree removal for the new roadway, haul route and fill areas would be executed.

Phase II would include the remaining grading of the entry/egress, Village Park, Village Road, and Village Place. The utility improvements would extend the water main to connect with the Blythen Way extension in Phase I, thereby providing a looped system including the southerly end of Blythen Way and most of Balmoral Drive. The other utilities would be extended from Balmoral Drive entry/exit including the improved roads of this phase. The tennis court would be constructed in Phase II. Also, the Maintenance/Living Unit and entry improvements would be included in this phase. Excavation from the far end of the Loop Road, Station 7-00 to Village Park, would be rough graded and material incorporated in the compacted fill to a maximum depth of 10 feet in the area of Village Park. When Phase II improvements are in place, the emergency gate will be installed at the end of Blythen Way and all ingress/egress will be from Balmoral Drive at the vicinity of 5700 Balmoral Drive.

Phase III would include the construction of the Loop Road, Swing Place, and Loop Place. This would include all associated utilities and complete the project's site improvements.

At all phases, erosion control methods would be properly and systematically performed.

The site work for Phase I will be performed in 1993. Phase II will follow by one year if the market and sales of Phase I are determined acceptable to Boyle. Phase III would follow Phase II or could be done simultaneously should the market be satisfactory.

The city has agreed to enter negotiations with Boyle to enter into a Development Agreement. Whereas Boyle has requested phased design review, the Development Agreement, should one be signed, would be the logical document for the phased development agreement and related details.

The maintenance building would be constructed early in Phase I to serve as the construction offices for the project. On-site streets would be private. No use of the project property by the public is planned. A property owners' association would maintain open and shared use areas, such as the tennis court, the tot and picnic area, paths linking areas of the site, streets, and street rights-of-way. The streets would be private, and it would be a gated community. This feature will require specific city approval, which has not yet been granted. Provision for emergency services access will be arranged with police, fire and ambulance services (see Section 4.7, "Utilities and Public Services"). Since the site is sloping, some retaining walls of variable heights will be required for driveways, landscaped areas of yards, and some portions of residences.

Grading for the project would include excavations for the roadways, utility and foundation trenching, and some drilling into the hillside on sloping sites for residences. The estimated amount of grading for the private roadways is low (approximately 8,500 cubic yards of cut and fill) since the roads are planned to follow the existing roadways on the site and natural contours (Boyle, 1993). The applicant has provided a set of maps to the city depicting grading, cuts and fills which will be used by the city to review and monitor site work. The estimated cubic yards excavated in "cuts" would be 5,168, with 1,679 cubic yards of "fill" needed. All excess of cut over fill (3,489 cubic yards) would be compacted on site in two available low valley areas. No materials would be exported from the site.

Sewer, water, and other utility lines along Balmoral Drive, Blythen Way, and adjacent easements would serve the project. Water would be pumped by EBMUD from the Madrone Reservoir which is adjacent to the project site, as residences in the area are currently supplied. A "looped" water system would be created by connecting the water main at the end of Blythen Way through the development to Balmoral Drive at the southerly end of the project. See Section 4.7, "Utilities and Public Services," for a detailed discussion.

EBMUD would process project sewage at it's recently expanded treatment facilities at the intersection of Interstate 580 and Interstate 80 in Oakland.

The city's police department and fire department would continue to provide public safety services. The site technically is currently in the Castro Valley Unified School District but students normally attend Oakland Schools because of the great distance to Castro Valley. The city and the Oakland Unified School District would receive a share of the County General Tax Funds and other local taxes and fees upon annexation to the city and the Oakland School District.

<u>Landscaping</u>. The applicant states that landscaping would be with native plants and drought resistant ornamentals. There are an estimated 3,000 trees on the project site. An estimated 232 (or about 8 percent) may be removed by the development consisting primarily of redwoods, oaks, and non-native species. The major landscape feature would continue to be the existing vegetation of mostly native trees.

The applicant's goals are that landscape designs near the new homes will maintain or supplement existing screening to off-site views. Homogeneous stands of trees (mostly redwoods) are planned for preservation as open areas and division lines for building sites. Foot paths would be provided where vegetation and topography allow. Parking areas would be screened by shrubs

and possibly trellises to soften the presence of motor vehicles. Rock outcroppings would be preserved and available occurring boulders would be utilized in the landscape. Landscape plans are subject to City of Oakland review and approval.

Vegetation Management. Annexation would subject the development to all the laws and ordinances of the city, including the city's tree ordinance and the vegetative management plans now emerging from the recent north Oakland Hills fire. The project area, even though presently in unincorporated Alameda County, has been serviced by the city for the past 50 years under mutual aid agreements. Annexation would clarify the responsibility for fire prevention measures, including vegetative management.

The maintenance of fuel break areas would be by the proposed homeowners association. Fuel breaks passing through stands of fire resistive species, such as mature native redwoods, oaks and bays, would require maintenance to eliminate any continuous fuel ladders. There are no eucalyptus trees on the project site. There are few pine trees, most of which occur in areas proposed for building pads and roadways. The consulting arborist has recommended their removal and replacement not only because of their flammability but also because they are an undesirable invasive species. Native species would be proposed as replacements by the applicant.

The proposed project would include the clearing of existing overgrown access roads along the northeasterly side of the property. Emergency access routes would allow the EBRPD to access their lands where the Blue Ribbon Report recommends the larger portion of the fuel break should be located. The 19 acre 1975 gift to EBRPD site by the previous owners of the project site was specifically to enhance the parks fire protection capabilities. The owners of the proposed project propose to allow the Park District annual access through the site for parks maintenance. The homeowners association would coordinate their annual fire break maintenance with the Park District fire break maintenance activities.

Drainage. Drainage from the existing site without the proposed project is to the southwest, northeast and easterly directions. Approximately 15 percent of the project site drains to the southwest towards the Lion Creek catchment. A relatively small amount of drainage joins the existing City system of Hillcrest Highlands which all drains to the Redwood Creek catchment.

The applicant has employed Lynn Bowers and Associates, Consulting Civil Engineers, Pleasanton, California, to design a drainage system sensitive to the site and the watershed. Drainage is discussed in more detail in Section 4.5, "Hydrology, Storm Drainage and Water Quality", and the Bowers study and plan is included as Appendix E.

Geology and Soils. Although the site is not presently within the City General Plan Area, the nearby city area is classified as Landslide Potential Zone III (very susceptible) in the Environmental Hazards Element of the General Plan. This environmental review includes a complete geological report including a study of seismic induced landslide capabilities for the worst case scenario of the proposed project.

3.4 ENVIRONMENTAL IMPACT FACTORS NOT CONSIDERED RELEVANT FOR THIS PROJECT

Based upon the Initial Study (see Appendix A) prepared by the City of Oakland, the following environmental impact issues are identified as not relevant for this project:

- Air quality;

- Risk of explosion or the release of hazardous substances;

- Relocation of residents or businesses;

- Destruction or defacement of a site of historic, architectural, archeological or aesthetic significance; or

- Involvement of an increase of 100 or more feet in the height of any structure over any previously existing adjacent structure.

3.5 OVERVIEW OF THE APPROVAL PROCESS

Required discretionary permits and approvals for the project will include:

a) Approval of the City of the annexation request, with associated General Plan Amendment and prezoning;

b) LAFCO annexation approval;

c) Tree removal permits;

d) Design review;

e) Preliminary and final PUD approval; and

f) Site-by-site design review for custom homes.

3.6 APPLICANT'S PROJECT OBJECTIVES

- Achieve City of Oakland annexation of 30.19 acres currently in unincorporated Alameda County.

- Achieve City of Oakland approval of a Planned Unit Development for 25.62 of the 30.19 acres. The proposed PUD would consist of 42 new single family detached homes and a maintenance shed with an apartment attached. The two homes now on the site would also remain, resulting in 45 dwelling units on the site with project buildout.

- Provide for a planned, orderly pattern of urban development.

4. EXISTING ENVIRONMENTAL SETTING, SIGNIFICANT ENVIRONMENTAL IMPACTS, AND MITIGATION MEASURES TO MINIMIZE SIGNIFICANT IMPACTS

4.1 LAND USE COMPATIBILITY AND POLICY CONFORMITY

EXISTING SETTING

On-Site and Surrounding Land Use. Two older single-family dwelling units are presently situated on the 25.62 acres of the proposed PUD. One of these residences includes accessory structures of sheds, a barn, and a rustic cabin. The area is generally sparsely settled and heavily wooded. The .40 acre Markley site with cottage and barn (5716 Balmoral Drive) is included in the territory proposed for annexation, as is a parking lot for high school teachers and students and the Madrone Reservoir, a water supply reservoir of EBMUD.

Across Balmoral Drive to the west is a 91 home development known as Hillcrest Highlands. The area is zoned R-30 (One Family Residential) and the smallest lots are approximately 8,000 sq. ft. (square feet) and the average is approximately 10,000 sq. ft. Home sizes in Hillcrest Highlands range from about 1,800 to 4,000 sq. ft., and are of both one and two story design.

Hillcrest Court, an existing PUD of 21 residential units on a 4 acre site, is also west of Balmoral Drive and approximately 200 feet south of the proposed access drive to the project. Average lot size is 8,297 square feet, with floor areas of homes approximately 2,000 square feet. This subdivision is zoned R-20 and R-30 is developed to the allowed density. Hillcrest Court homes are two-story single-family detached units along the Balmoral Drive frontage, with the remainder and majority of the 21 units being duets of one- and two-story design.

South of the Hillcrest Court subdivision and the high school and across Skyline Drive is a development known as Hillcrest Estates. The 238 unit development is zoned R-10, and homes are single-family residences in spacious settings, most of them built in the late 1950s and early 1960s. Houses are generally ranch style, although several located on sloped sites have additional levels. The more recently constructed tend to have multiple levels but are designed to blend harmoniously with the other residences. The Oakland Hills Tennis Club, along Skyline Drive just west of the Balmoral Drive intersection, features a swimming pool and other sports opportunities in addition to tennis courts.

Skyline High School, built in 1959-60, is to the south and southeast of the proposed project site. The school is accessed from Skyline Boulevard east of Balmoral Drive and is screened from the project site by a dense stand of trees along the common property line. For a detailed discussion of schools, please see Section 4.7, "Utilities and Public Services."

Redwood Road intersects Skyline Boulevard about 1/2 mile southwest of the proposed project site and has commercial and office development. North from that intersection Redwood Road descends into Redwood Canyon and turns east, crossing and recrossing Redwood Creek. Redwood Road marks the division

between the Anthony Chabot Regional Park to the south and west and the Redwood Regional Park to the north and east. Several horse stables are located off of Redwood Road. The City of Oakland city limits are at Balmoral Drive on the west side of the proposed project site.

The property has been of interest as a possible addition to the adjacent East Bay Regional Park District Lands. The Redwood Creek Area (land bounded on the north and east by the East Bay Regional Parkland, on the south by existing development, and on the west by Blythen Way and Balmoral Drive) is included as one of the properties identified in Measure K for possible public acquisition for the maintenance of open space. Three series of bonds will be issued to fund the acquisitions. The first series of bonds were issued and this property was not acquired. The tentative priority list for the second series of purchases also does not include this property. Approval of this project (i.e., annexation, prezoning, planned unit development) will not, in and of itself, affect Measure K acquisition. Measure K is a separate and distinct process from this project and the property could still be acquired even after project approval.

The site is posted "No Trespassing," and the applicant has indicated that few people are seen on the site. Occasionally high school students cut through the fence and hang out on the site, despite efforts of the applicant and the school authorities to discourage it. Anthony Chabot Regional Park makes common boundary with the proposed project's east side. Further east across Redwood Road, approximately 3/4 mile east of the project site, the East Ridge and West Ridge public trails follow a northwest-to-southeast trending ridgeline through the Redwood Regional Park.

City of Oakland General Plan. The policies of the Oakland Comprehensive Plan guide development within the city. The proposed project may relate to the following policies of the comprehensive plan.

Open Space and Natural Resources, General Considerations:

- "In all development and construction in the Hills (those areas located generally along and northeast of Mountain Boulevard) special efforts should be made to conserve open space and natural resources. Every development which occurs here on a site of substantial size should reserve the most appropriate portions as permanent open space, and these should generally add up to a significant proportion of the site" (55637, page J-1, Oakland Policy Plan)

- "Development on slopes of 15 to 30 percent should generally be designed with special attention to controlling runoff and erosion and to preserving the natural topography as much as possible. Cuts and fills and the removal of desirable vegetation should be minimized" (55637, page J-2, Oakland Policy Plan).

- "Development involving significant alteration of natural land forms or surface conditions should generally be discouraged on slopes greater than 30 percent. Where development does occur here, graded and natural slopes should be planted to hold easily eroded soil in place and cover unsightly scars" (55637, page J-2, Oakland Policy Plan).

General Considerations, Policies on Land Use Regulation, Mixture, and Transition:

- "In general the boundary between areas or zones of potentially inharmonious land uses should, where practicable, run along rear property lines rather than down the middle of a street" (Number 5, Policies on Land Use Regulation, Mixture, and Transition, Land Use, An Element of the Oakland Comprehensive Plan, page 22).

Residential Uses, Policies on Design of New Housing:

- "A residential building's height, bulk, and appearance should be harmonious with nearby buildings, the natural setting, and the area's desired character. Actual likeness to nearby buildings is usually called for where the desired area character depends strongly on homogeneity of building style or scale" (Number 1, Policies on Design of New Housing, Land Use, An Element of the Oakland Comprehensive Plan, pages 40 and 41).

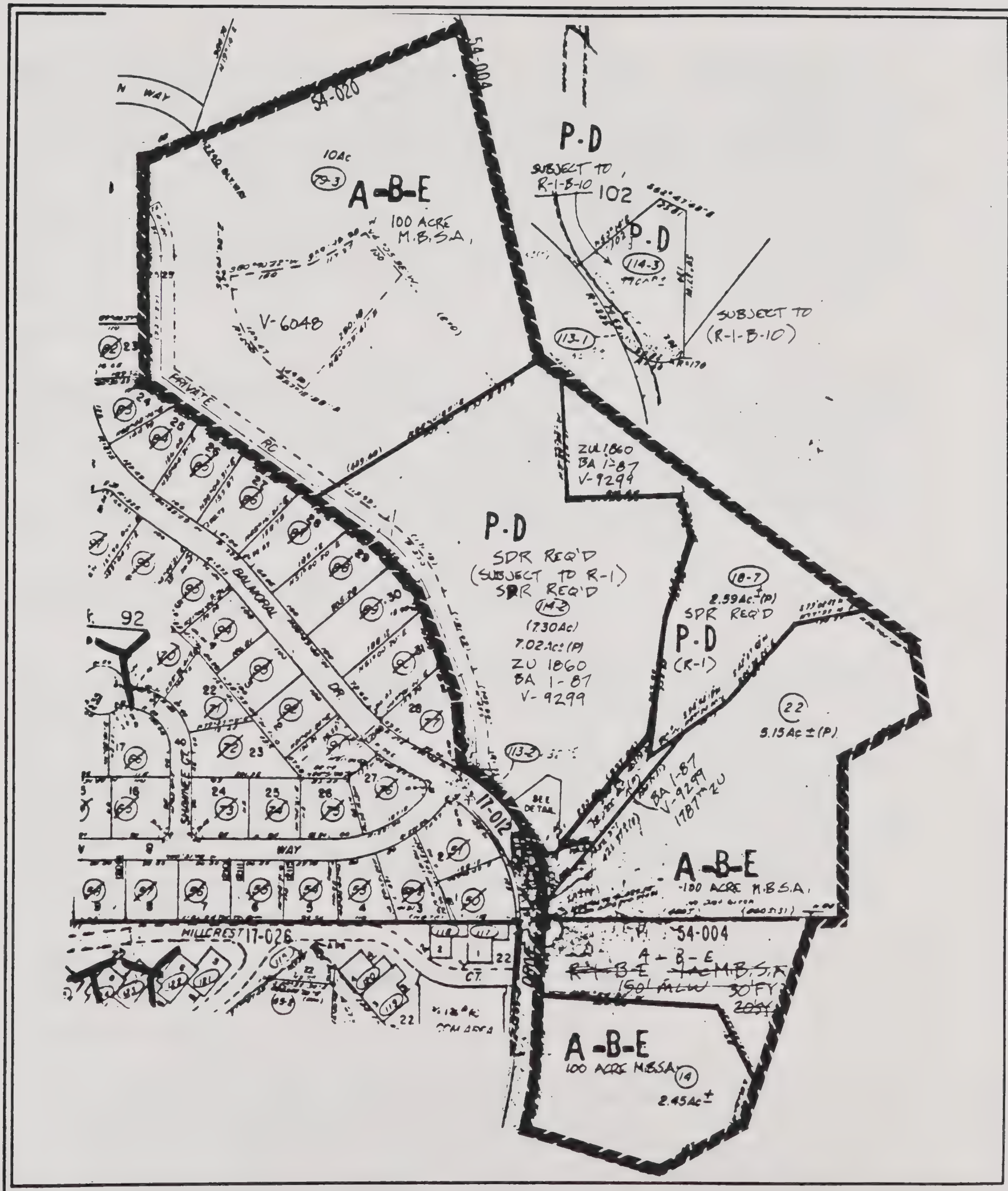
- "Residential developments should be designed so as to orient their own units to desirable sunlight and views, to avoid unreasonably blocking sunlight and views for neighboring buildings, to provide for sufficient conveniently located on-site usable open space, and to avoid undue noise exposure" (Number 2, Policies on Design of New Housing, Land Use, An Element of the Oakland Comprehensive Plan, page 41).

- "Residential building placement and landscape treatment should be harmonious with the adjoining street scene" (Number 3, Policies on Design of New Housing, Land Use, An Element of the Oakland Comprehensive Plan, page 41).

- "Off-street parking for residential buildings should be adequate in amount and conveniently located and laid out, but in general its visual prominence should be minimized" (Number 4, Policies on Design of New Housing, Land Use, An Element of the Oakland Comprehensive Plan page 41).

Land Use Policies. The project site is currently within unincorporated Alameda County and is zoned A-B-E (100) and PD (see Figure 4.1-1). A-B-E (100) means 100 acre minimum, while PD stands for Planned Development. The property is not currently designated on the City of Oakland land use map, as it is not within city limits. However, the project site is within the City of Oakland's Sphere of Influence as defined by the City of Oakland and by LAFCO. The City of Oakland Illustrative Future Land Use map includes adjacent areas that are within the City of Oakland. These areas are shown as Suburban Residential to its west, and Institutional or Governmental to its southeast [Map 2, Illustrative Future Land Use, Land Use Element, p. 18].

Zoning Ordinance. The project site is currently zoned A-B-E (100) and PD by the County of Alameda. Areas adjacent to the project site within the City of Oakland are zoned Suburban Residential (R-10 and R-20) and Low-Density Residential (R-30) [Generalized Zoning, 1980, Land Use Element, p. 83]. The R-10 zoning is intended to create, preserve, and enhance areas for single-



No Scale

FIGURE 4.1-1
ALAMEDA COUNTY ZONING
FOR THE SITE

CERTIFIED/Earth Metrics

Source: Alameda County, 1993

family estate living at very low densities in spacious environments and is typically appropriate to portions of the Oakland Hill area. Minimum lot size is 25,000 square feet. The R-20 zoning is intended to create, preserve, and enhance areas for single-family dwellings at low densities in spacious environments, and is typically appropriate to portions of the Oakland Hill area. Minimum lot size is 12,000 square feet. The R-30 zoning is intended to create, preserve, and enhance areas for single-family dwellings in desirable settings for urban living, and is typically appropriate to already developed lower density dwelling areas of the city. Minimum lot area is 5,000 square feet.

IMPACTS

Standard of Significance. The adverse land use impacts of a project will be identified as significant if the project would conflict with policies of the City of Oakland General Plan, the land use map, or city zoning ordinance; would conflict with established recreational, educational, religious, or scientific uses of the area; would convert prime agricultural land to non-agricultural use or impair the agricultural productivity of prime agricultural land; or would be incompatible with surrounding land use.

On Site and Surrounding Land Use. The project site is currently a low-density residential area dominated by wooded and natural areas. It is not used for agricultural purposes.

The proposed residential project of single-family detached housing would be compatible with existing single-family detached housing adjacent to this property. It would be less compatible with the park areas bordering to the east, but except for a small area at the southeast corner of the site, the actual developed area stays well back of the border with the park. However, this project will permanently remove 25.67 acres of open space currently integrated into the regional open space network from use as open space. This is a significant impact that cannot be avoided if the project is implemented. The proposed plan includes buffering vegetation designed to minimize any visual or noise impacts of the high school facilities to its south on the proposed residences.

General Plan. The policies from the City of Oakland Comprehensive Plan, noted in the "Existing Setting" section, are discussed below.

Open Space and Natural Resources, General Considerations:

- "In all development and construction in the Hills (those areas located generally along and northeast of Mountain Boulevard) special efforts should be made to conserve open space and natural resources. Every development which occurs here on a site of substantial size should reserve the most appropriate portions as permanent open space, and these should generally add up to a significant proportion of the site" (55637, page J-1, Oakland Policy Plan).

DISCUSSION: Approximately 25 percent of the site would remain undisturbed, even though subdivided and in multiple private ownership. Most of that undisturbed area would be along the north and east sides of the site which

abuts Anthony Chabot Regional Park, the most appropriate part of the site to leave in undisturbed in order to maximize land use compatibility with the park. The project is generally consistent with this City of Oakland policy, however, it will permanently remove 25.67 acres currently integrated with the regional open space network from potential future use as publicly accessible open space. This is a significant unavoidable impact of this project.

Oakland Policies Plan, p. I-1, #5, Parks and Recreation System.

> "All major new residential, and high density nonresidential, developments should provide on-site usable open space for their occupant and, where appropriate, the general public. (55637)

DISCUSSION:

The proposed project does not currently include dedicated public open space. The project will permanently remove a substantial proportion of the site from a "functional open space" use, now accessible to neighbors for recreational access. It should be noted that the current usage of the site by neighbors is not a right, since the property is privately owned. Nevertheless, this is identified as a significant adverse impact to an area otherwise short on recreational opportunities, which can be mitigated.

- "Development on slopes of 15 to 30 percent should generally be designed with special attention to controlling runoff and erosion and to preserving the natural topography as much as possible. Cuts and fills and the removal of desirable vegetation should be minimized" (55637, page J-2, Oakland Policy Plan).

DISCUSSION: The project would minimize cut and fill and the removal of existing vegetation by siting the housing units to conform to the hillside rather than benching the home sites. A majority of the site would retain its natural vegetation cover. The project is generally consistent with the City of Oakland policy. See also Section 4.5 for erosion prevention measures.

- "Development involving significant alteration of natural land forms or surface conditions should generally be discouraged on slopes greater than 30 percent. Where development does occur here, graded and natural slopes should be planted to hold easily eroded soil in place and cover unsightly scars" (55637, page J-2, Oakland Policy Plan).

DISCUSSION: The proposed development will be mostly on slopes less than 30%, but some development is to occur on slopes greater than 30%. This EIR proposes mitigation measures (see Section 4.5, Hydrology) to hold erodible soils in place on all slopes. With these mitigations, the project is generally consistent with the City of Oakland policy.

General Considerations, Policies on Land Use Regulation, Mixture, and Transition:

- "In general the boundary between areas or zones of potentially inharmonious land uses should, where practicable, run along rear property lines rather than down the middle of a street" (Number 5,

Policies on Land Use Regulation, Mixture, and Transition, Land Use: An Element of the Oakland Comprehensive Plan, page 22).

DISCUSSION: The areas of potentially inharmonious land use would be along the site's boundary with the regional park and along its boundary with the school parking lot. In the former, the proposed development largely keeps substantial distance from the boundary, providing a large buffer area or transition zone. In the latter, a buffer of trees and vegetation will be maintained to minimize any adverse noise effects of the school parking lot use on proposed project homes. The project is generally consistent with this City of Oakland policy.

Residential Uses, Policies on Design of New Housing:

- "A residential building's height, bulk, and appearance should be harmonious with nearby buildings, the natural setting, and the area's desired character. Actual likeness to nearby buildings is usually called for where the desired area character depends strongly on homogeneity of building style or scale" (Number 1, Policies on Design of New Housing, Land Use: An Element of the Oakland Comprehensive Plan pages 40 and 41).

DISCUSSION: The homes are proposed to be designed to complement the natural setting and to be harmonious with adjacent residential development. This will be enforced through individual site design review. Although their average size may be larger than adjacent homes west of Balmoral, the proposed homes appear to be scaled to the larger project lots and this is not identified as a significant impact. With the proposed mitigations and design review, the project is generally consistent with the City of Oakland policy.

- "Residential developments should be designed so as to orient their own units to desirable sunlight and views, to avoid unreasonably blocking sunlight and views for neighboring buildings, to provide for sufficient conveniently located on-site usable open space, and to avoid undue noise exposure" (Number 2, Policies on Design of New Hosing, Land Use: An Element of the Oakland Comprehensive Plan, Page 41).

DISCUSSION: The custom design of each home will allow maximum latitude for each home to be sited to optimize passive solar features and to preserve most of the trees on the site.

However, the project plans currently do not designate open space other than that contained on private lots. While a tot lot and "redwood grove" are designated, there is no provision for their remaining permanently accessible to site residents. The exclusive nature of the gated community would not provide access for nearby residents or for public use of these open spaces. This is identified as a significant impact that can be mitigated by eliminating the gated access, a separate lot for the tot lot which is common open space, conservation easements to protect those areas left as open space and a network of trails to be maintained by the homeowners association and available to nearby residents.

- "Residential building placement and landscape treatment should be harmonious with the adjoining street scene" (Number 3, Policies on Design of New Housing, Land Use: An Element of the Oakland Comprehensive Plan, page 41).

DISCUSSION: The applicant's plans appear to be designed to be harmonious with the adjoining street scene. The project is generally consistent with this City of Oakland policy.

- "Off-street parking for residential buildings should be adequate in amount and conveniently located and laid out, but in general its visual prominence should be minimized" (Number 4, Policies on Design of New Housing, Land Use: An Element of the Oakland Comprehensive Plan, page 41).

DISCUSSION: The project design provides parking capacity, of 178 spaces which is well beyond city minimum requirements (2 spaces per unit and 1 space per 5 units for visitor parking - total 100 spaces for this development) and conveniently located and designed to minimize its visual prominence. The project is generally consistent with this City of Oakland policy.

Zoning Ordinance. The applicant's petition for prezoning to R-10 is more conservative than the immediately adjacent City of Oakland zoning of R-30 and R-20 and would therefore be consistent with the goal of providing a buffer between urban development and the regional park system. R-10 zoning would allow the proposed 45 units to be built. The proposed PUD is consistent with city R-10 zoning (Low Density, or Estate Residential), and would result in a total of 45 residential units, 43 of which would be new construction. Two of the 43 have already been approved by the County of Alameda, which represents the maximum density (4 units) allowed under the county zoning. The R-10 zoning is compatible with the applicant's concept of the best use of the land consistent with the preservation of the essentially wooded and rustic nature of the site and its location next to the Anthony Chabot Regional Park.

MITIGATION MEASURES

Unless otherwise noted, implementation of the following mitigation measures will reduce identified significant adverse impacts to less-than-significant levels:

Surrounding Land Uses

- Include permanent conservation easements for the eastern portions of lots 33, 34, 35, 36, 37, 39, 40, and 42, and a portion of lot 31 south of the area proposed for development up to and including the homogeneous redwood grove, including trails through the area.

- Make the proposed picnic area and tot park public property available to both Redwood Village residents and the general public.

- The permanent removal of 25.67 acres of open space currently integrated into the network of regional open space from this use is a significant

impact of the project that cannot be mitigated to less than significant levels.

General Plan. See Section 4.5, "Hydrology," for erosion control mitigation measures.

- Eliminate gated access feature.

- Create separate commonly held lot for the tot lot.

- Make site trails available to nearby residents, and provide for their maintenance by the Homeowners Association.

Zoning Ordinance. No mitigation measures are required.

4.2 VISUAL AND DESIGN FACTORS

EXISTING SETTING

The project site is located on a ridge above Redwood Canyon and Redwood Road (see Figure 4.2-1), north of the intersection of Skyline Boulevard and Balmoral Drive, and just outside the Oakland city limits. The site borders the open space network that includes Redwood Regional Park, Anthony Chabot Regional Park, and Joaquin Miller Park. The site is partially visible from adjacent residential area roadways such as Balmoral Drive, Tartan Way and Blythen Way, and from pedestrian, bicycle and horse trails within Redwood Regional Park.

To the west and north of the proposed project site are existing residential areas within the City of Oakland and constructed within the past 25 years. Lot sizes in these existing areas range from 8 - 12,000 square feet, with floor areas in the range of 15 - 2,500 square feet and one and two stories. The homes are built to R-20 and R-30 zoning standards, with setbacks appropriate to these zones.

The topography of the local area strongly influences the visibility of the project site. The hill crest hides the site from most of the city and the site is not visible from either Skyline Boulevard or Redwood Road. Canyons, slopes, and vegetation combine to limit views of the site from local off-site vantages.

The vegetation on the site enhances its visual quality. A mosaic of woodland areas and open grassy zones on the site is visible in certain locations for short periods of time to motorists traveling along Balmoral Drive, Tartan Way and Balwaver Way. The visual character of the site is predominantly a wooded, natural landscape with pockets of grassland areas. Redwoods, oaks, madrones and chaparral are the major species covering the property.

The site is between the developed residential areas along Balmoral Drive and Skyline Boulevard and the rural and open space settings to the east in Redwood Canyon and beyond. Substantial residential development has occurred along the Skyline Boulevard ridge crest, while the eastern slope of Skyline Ridge remains wooded and undeveloped. The steep, wooded slopes to the east of the site have been preserved or returned to a natural state after acquisition by the East Bay Regional Park District.

The project site ranges in elevation from approximately 1,220 feet above means sea level (msl) at the top of the ridgeline to approximately 1,000 feet msl at Redwood Canyon Road. The majority of the development will occur on either the western or eastern sides of the ridgeline. Balmoral Drive has an elevation ranging from 1,180 feet msl at the intersection with Tartan Way to 1,120 feet msl at the northern cul-de-sac. Tartan Way ranges from 1,180 feet msl to 1,100 feet msl at its western cul-de-sac. Bellwaver Way ranges from 1,140 feet msl at its intersection with Balmoral Drive to 1,120 feet msl at its western cul-de-sac. Blythen Way ranges from 1,100 feet msl at its western cul-de-sac to 1,140 at the project boundary.

Plate A:

Figure 4.2-1 View of Project Site from Equestrian Jumping Area

There are several dwellings and structures, including two permanent residences and a mobile home, located on the project site. These are single story residences located on knolls and well screened by stands of mature trees. Approximately 13 residences are located along the western perimeter of the site. Many of these houses are two stories. There are two additional residences located immediately adjacent to the site, the Sommer's and the Meyer's properties. The Meyer's property consists of a small rustic single story cottage and a barn, while the Sommer's property contains a contemporary residence with a pool.

Three paved roads currently exist on the site, one road leading to the Sommer's property through the southern end of the site, a second running from Balmoral Drive to the ridge line and a house at the center of the site, and a third running from Blythen Way to the current Boyle residence. Throughout the property there are signs of previous human activity, such as the horse pasture by the Meyer's property, old piping and swing set at the top of the southern knoll, and scattered fence posts.

<u>View Corridors</u>. View corridors described in this section originate from likely viewer vantage points and focus on the proposed project site. A view corridor is a vista spanning a distant area from the point of visual origin. The significant view corridors that would be affected by the proposed project include some of the public trails within Redwood Regional Park and the horse jumping area east of Skyline Boulevard. Additionally, local residences, Skyline Ranch, and the Oakland Riding Academy presently retain partial views of the project site's terrain or vegetation (Figure 4.2-1). The West Ridge Trail within the Redwood Regional Park is examined because of the number of pedestrians, bicyclists and equestrians who use the trail.

<u>View Opportunities</u>. View opportunities are those views of scenic vistas available from the project site. Because the project site is on a ridge in a scenic area, a number of aesthetic view opportunities are available on and from the site. Views of the undeveloped, wooded and grassy hillsides of Redwood Regional Park, Redwood Canyon, and Chabot Regional Park are available from the project site as well as views of San Francisco Bay, San Francisco, Oakland, Berkeley and other cities of the Bay Area. The natural mosaic of vegetation on and near the site also provides aesthetic view opportunities.

<u>City of Oakland General Plan</u>. The city expresses as a goal in the Open Space, Conservation, and Recreation Element of its General Plan "to conserve with care the open space and natural resources which will be needed by present and future generations." However, as the General Plan discusses, the term "Conservation" does not exclude development since "future development seems necessary to meet Oakland's economic and housing goals... The goal therefore implies that the long-range need for open space and natural resources must be kept in mind, and that any consumption of them must be carefully justified." Under the City's definition of open space, which is defined as "any land or water area which is essentially unbuilt on", portions of the project site could be considered open space.

The Oakland General Plan contains the following policies which relate to the conservation of visual resources and are directly relevant to the proposed project.

- Urban development wherever it occurs should be related sensitively to the natural setting, with the scale and intensity of development in each case bearing a reasonable relationship to the physical characteristic of the site.

- In all development and construction in the Hills (those areas located generally along and northeast of Mountain Boulevard) special efforts should be made to conserve open space and natural resources. Every development which occurs here on a site of substantial size should reserve the most appropriate portions as permanent open space, and these should generally add up to a significant proportion of the site.

Photosimulation. Plates 1 through 7 of Figure 4.2-2 show views of the site from areas in the vicinity, and Plate 8 provides an aerial view of the project site. Plate 9 shows the pipe and balloon device used for height delineation. Figure 4.2-3 indicates the location and direction of the photographs of Figure 4.2-2. Figure 4.2-2 shows photosimulations of the proposed project as well as the existing views of the project site. The photographs have been presented in a side by side format to facilitate comparison.

IMPACTS OF THE PROPOSED ACTION

Standard of Significance. A project will be identified as having a significant adverse visual impact if it would have a substantial, demonstrable negative aesthetic effect. The determination is based on several criteria including observer position, views, view corridors, existing and proposed screening, backdrop, the characteristics of the proposed development, and the existing visual character of the surrounding area.

Approach to Analysis. Visual resources and visual quality are terms used to describe human perceptions of combining form, bulk, scale, texture, color, and viewing range of a site, relative to the context of its locale. Such perceptions are difficult to quantify and are essentially subjective in scope. Due to this, definitive and universally applicable visual quality standards are not available by which to measure project impacts. Nevertheless, project impacts to visual conditions are important environmental concerns, subject to CEQA assessment. Although all such assessments must to some extent rely on generalized judgments, impacts can be identified and determined to be significant or non-significant based upon the perceived change to the landscape, and avoidable or unavoidable depending upon implementation and effectiveness of feasible mitigation.

The surrounding area was walked and driven and trails were hiked to determine the range of views into the site. White plastic pipe of 20 foot lengths with balloons attached at mid-height and top were set in vertical positions at known focus points to assist the proper location and scale of the photomontage process into the photographs (see Figure 4.2-2, Plate 9). The camera locations were mapped (see Figure 4.2-4). Plans of the building locations, elevations and grades were provided along with architectural prototypical plans and elevations to Kahn Kay Associates, Architectural Illustrators, Oakland, California for six selected camera points which included the approximately 15 viewable structures of the 41 new homes proposed. The other two photosimulations were prepared by CERTIFIED/Earth Metrics. The

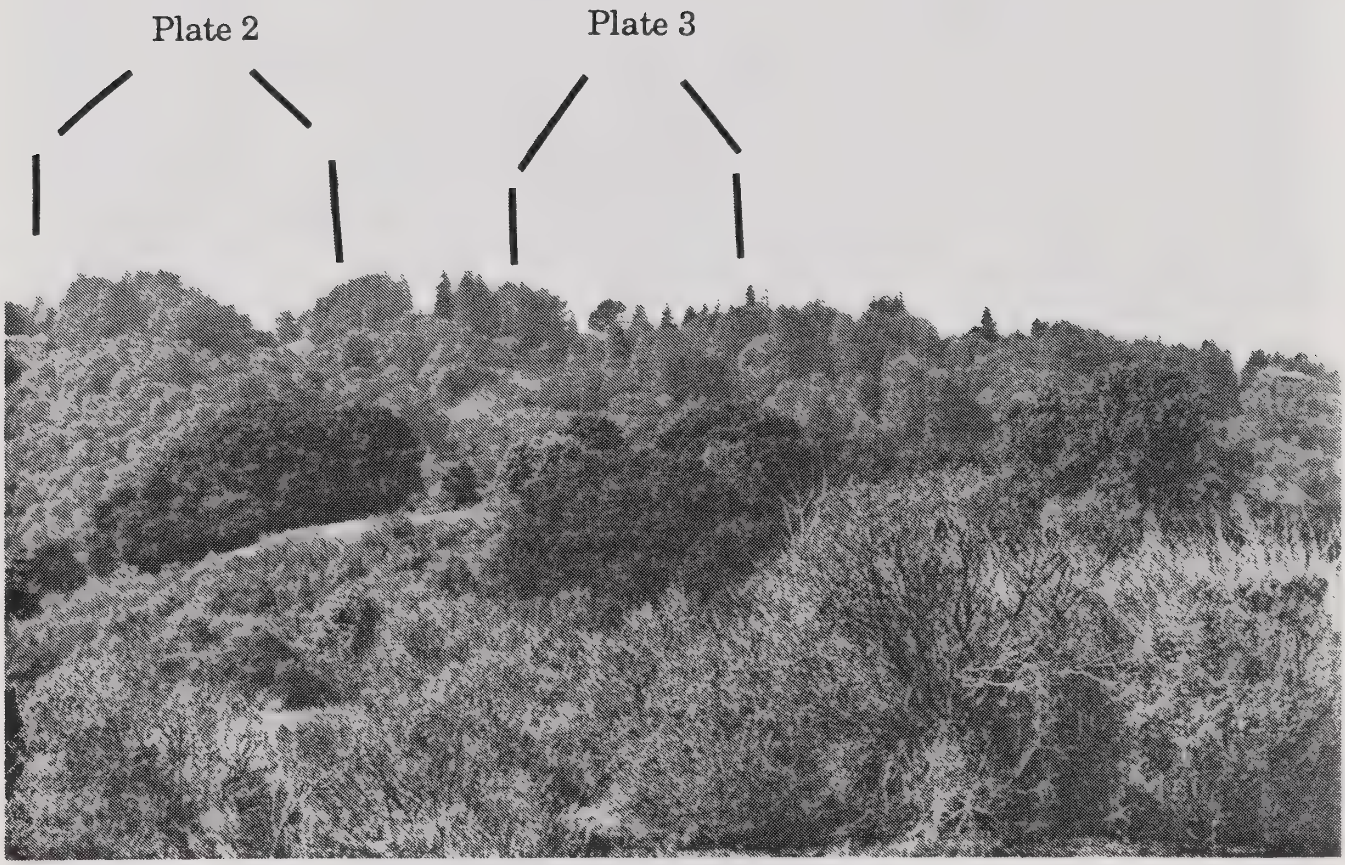


Plate 1: This photograph is a view of the project site from the West Ridge Trail in Redwood Regional Park. The location of Plates 2 and 3 are shown to aid the reader.

Figure 4.2-2 Photosimulation of project

Plate 2a: This is telephoto view taken from the West Ridge Trail. The lens used increased the magnification by three and one half times. The house on the left is the existing Sommer's property.

Plate 2b: The same view with lots 19 and 27 superimposed. Both lots would have vegetation for backgrounds. Lots 20, 21, and 26 would be hidden by vegetation.

Figure 4.2-2 (continued)

Plate 3a: Telephoto view (3.5:1 magnification) of lots 30, 32, 33, 34, and 35. The house on the left is the existing residence.

Plate 3b: The same view with lots 8, 33 and 34 superimposed. Lot 8 is located above lots 33 and 34 , lots 32 and 35 would be hidden behind vegetation.

Figure 4.2-2 (continued)

Plate 4a: A view to the southeast of lots 4, 5, and 6 from Bell Waver Way. The white plastic pipe used for height delineation is visible on Lot 4.

Plate 4b: Lot 4 would extend above the tree line and would create a new skyline. Lots 5 and 6 would also be visible. however, their roof lines would be below the tree line.

Figure 4.2-2 (continued)

Plate 5a: This view of the site is from Balmoral Drive. This view shows the site in context with the existing residential area located west of the project site.

Plate 5b: Lots 3, 4, 6, and 7 are superimposed on the view from Balmoral Drive. Site 5 is located behind Lot 6.

Figure 4.2-2 (continued)

Plate 6a: This view of the site is looking southward along Balmoral Drive.

Plate 6b: Lot 8 is shown from this perspective. All other lots would be screened by vegetation.

Figure 4.2-2 (continued)

Plate 7a: This is an eastern view of the ridge area of the project site from Shawnee Court.

Plate 7b: This view shows lots 6, 7, and 8.

Figure 4.2-2 (continued)

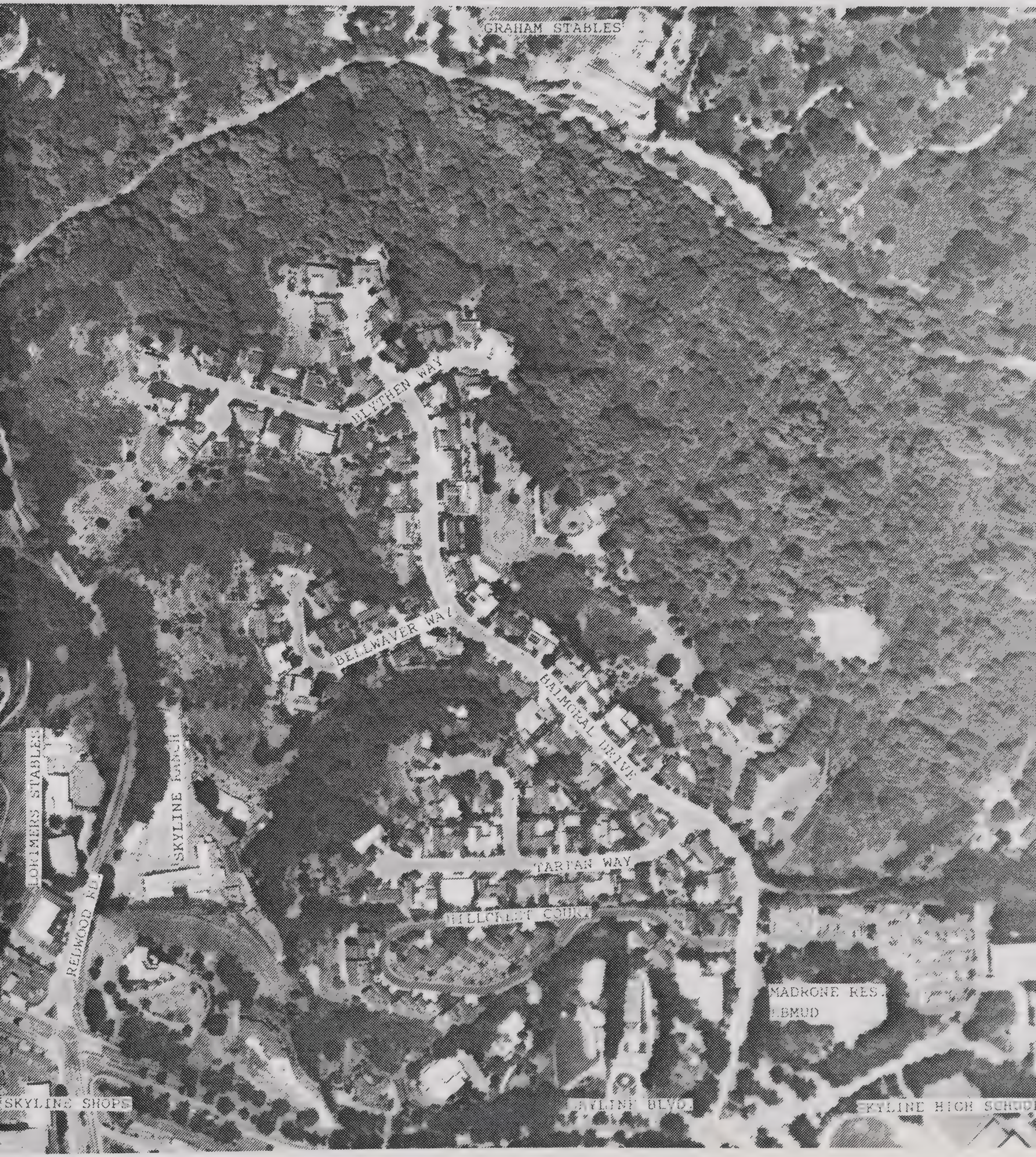


Plate 8a. This photograph shows the project site from an aerial view. Notice the developed residential area to the west of the project site.

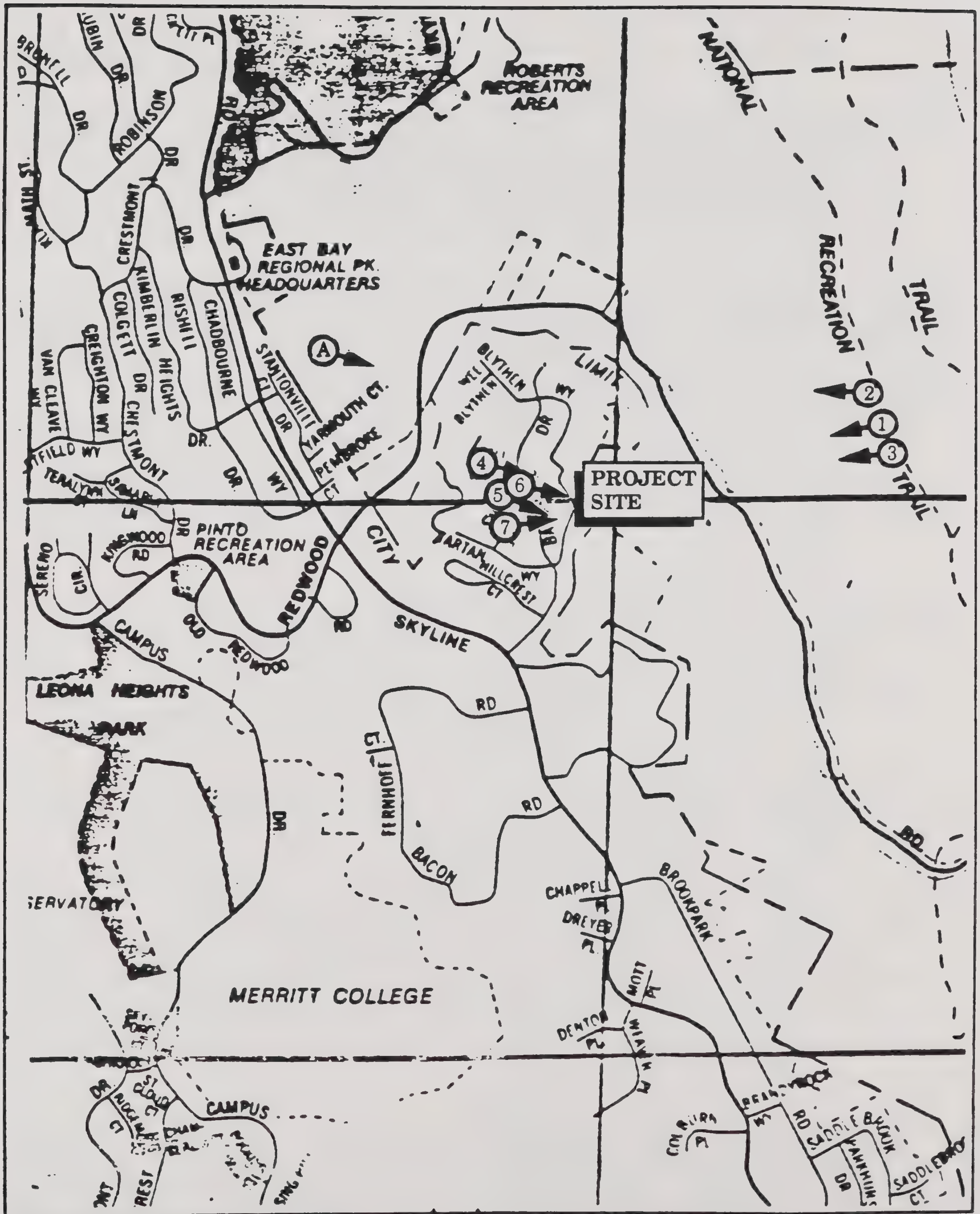
Figure 4.2-2 (Continued)

Plate 8b. This plate has the project overlaid on the aerial photograph showing the proposed house footprints and roadways.

Figure 4.2-2 (Continued)

Plate 9: Close up of piping and balloons used for height delineation.

Figure 4.2-2 (continued)



earth metrics	N SCALE No Scale	FIGURE 4.2-3 LOCATION OF PHOTOGRAPH

information allowed the perspective introduced in to the photographic enlargement to approach a true size and perspective.

The perspective view illustration of the proposed entrance/exit to the project required the use of several photographs, plans, and sketches since the existing trees blocked out camera view from the desired camera point and demanded of Mr. Kahn's illustrative experience and skills. Shading to simulate a sun angle in the photograph was added to the building forms to provide a more realistic visual effect (see Figure 4.2-4).

Visual and Aesthetic Impacts. The proposed project will change the visual character of a ridgeline. As the visual photosimulation demonstrates, what is presently a wooded ridge and two wooded slopes above a developed residential area would be developed with residential structures (Plates 4, 5, 6, and 7), thus modifying the skyline view from certain perspectives. Residences on lots 3, 4, 5, 6, and 8 would be the most visible. These lots are visible from Balmoral Drive, especially from the intersection of Balmoral Drive, Balwaver Way, and Shawnee Court due to the lack of screening vegetation and the nearness to Balmoral Drive. Lots 11 and 25 located on the southern knoll would also be visible once the entryway into the project site has been completed (see Figure 4.2-4). This is a significant unavoidable impact of the project.

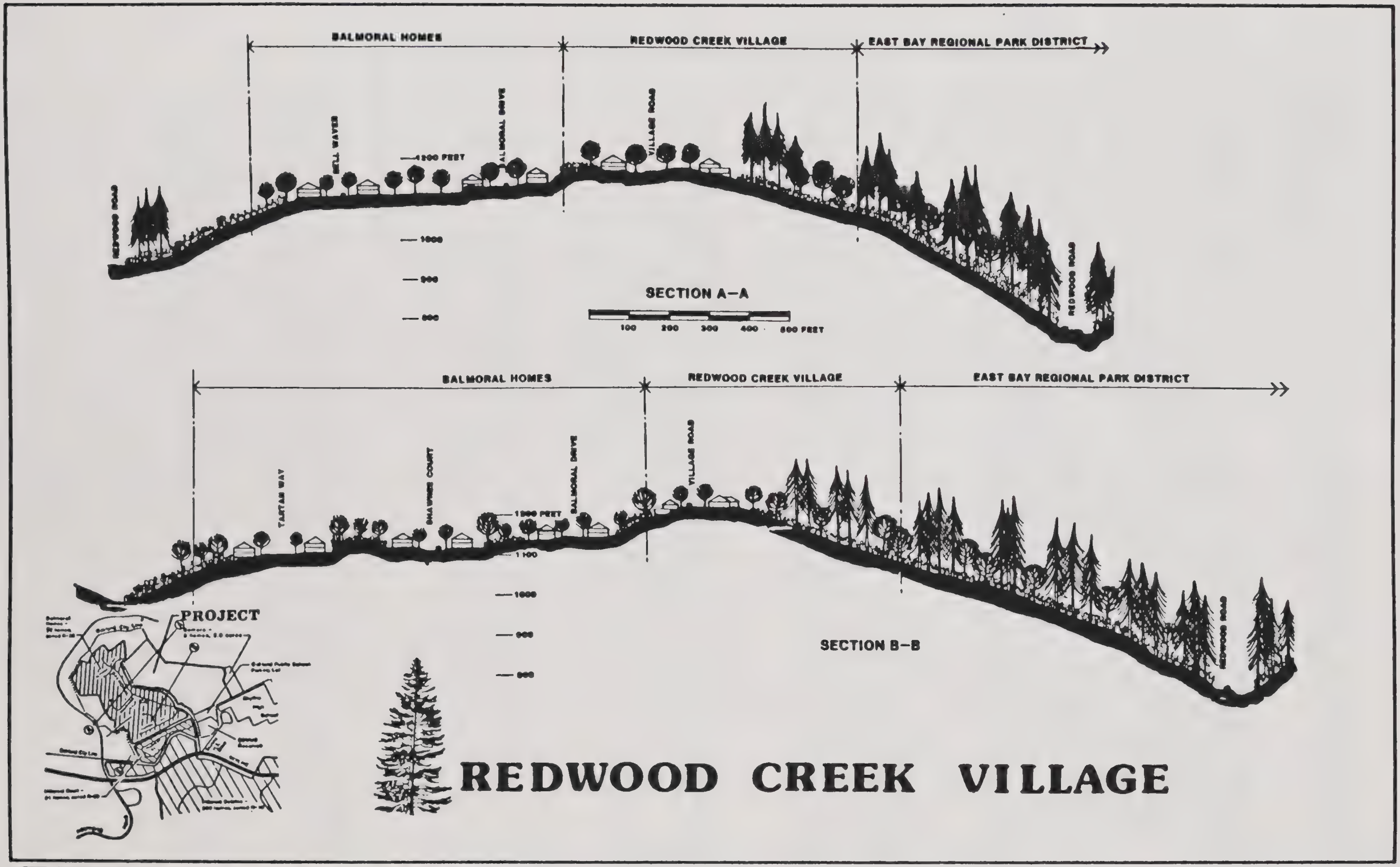
As shown in Figure 4.2-2, Plates 2 and 3, lots 19, and 27 would be visible from Redwood Regional Park. These sites would have vegetative screening which would reduce their visibility; and, depending on the vegetative screening and building materials used, their visibility can be reduced even further. Development in other areas of the site would have little or no visual impact off site because topography, existing vegetation, site design, and planned landscaping would screen these lots from view.

Project development would continue the existing residential area west of the project site along Balmoral Drive, Balwaver Way, Tartan Way, Shawnee Court and Blythen Way. As shown in the cross section of the project site (see Figure 4.2-5), substantial residential development exists west of the project site, and the project would be a logical extension of that development. This figure also shows how the steep slope along the western boundary of the site limits the views into the property from the residences immediately adjacent along Balmoral Drive. In only one portion of the project site (lot 10) is the elevation difference between the project site and Balmoral Drive less than 40 feet. Lot 10 would be located southeast of one existing residence and adjacent to Balmoral Drive. The other lots along the western side of the ridge (lots 1, 2, 3, 4, 5, 6, 7, 8, and 9) are at least 40 feet above Balmoral Drive.

Project homes are proposed to be architecturally designed to fit the natural contours of each lot. Use of natural colors and building materials, split level homes, and vegetative screening are proposed to make the homes blend into hillsides and existing vegetation (Boyle, 1992). Some of the proposed houses on the western side of the project site ridgeline have the potential for being highly visible from existing residences and roadways. These visual impacts have been identified as potentially significant because some of the homes would be very visible from nearby public roadways and the horizon views

FIGURE 4.2-4
ARTIST'S RENDERING OF REDWOOD VILLAGE ENTRANCE

CERTIFIED/Earth Metrics



earth metrics

SCALE
No Scale

FIGURE 4.2-5 CROSS-SECTION OF PROJECT SITE

onto the site would be altered. These impacts can be reduced to a less than significant level by the adoption and implementation of the suggested mitigation measures.

The applicant proposes to utilize low-rise street lighting to reduce nighttime glare from the project site. Daytime reflection from automobile and window glass associated with the development would make the site more visually noticeable. Impacts related to light and glare are not identified as significant, as the development of the custom residences could reduce potential off-site light and glare through proper site and home design.

View Corridors. Public views of the site from hiking, bicycling, and equestrian trails in Redwood Regional Park (as shown in Plates 2 and 3, which shows lots 19 and 27) are not identified as significant. The distance of the site from the park, as well as the limited number of views of the project site from the park, make the potential impacts of this development less than significant.

Other views of the project site from Balwaver Way, Shawnee Court and Balmoral Drive are shown in Plates 2, 3 and 4. From these views portions of the project would be noticeable. Because of the hilly topography in the project area and numerous trees, however, visual corridors of the site are broken into smaller vantage points. The length of time a pedestrian or motorist would view the site from these vantage points would be limited and is not identified as significant.

City of Oakland General Plan. The proposed project is found to be consistent with the General Plan policy requiring development to be related sensitively to the natural setting, with scale and intensity of development bearing a reasonable relationship to the physical characteristics of the site. Because each of the proposed residences will be designed by an architect for each lot, natural topography, views, and vegetation can be taken into consideration in planning the floor plan, height, bulk, and setbacks.

The proposed project also is found to be consistent with the General Plan requirement that every development of substantial size (in the Hills) should reserve the most appropriate portions as permanent open space. The site plan indicates that the majority of the project site would not be directly altered (see Figure 4.2-2, Plate 8).

MITIGATION MEASURES

- Design of individual residences shall be scaled to site topography, vegetation, views and other lot specific elements as indicated in "Redwood Creek Village, March 16, 1993," filed with the City of Oakland Planning Department, or as approved by the City.

- The most visible lots, 3, 4, 5, 6, 7, 8, 9, 11, and 25 shall be heavily landscaped along their western boundaries to screen the homes from adjacent properties.

- Exterior building materials shall be fire resistant and natural in appearance, in order that the development blend with the site's natural setting.

- The project applicant shall submit a landscape plan to the city for approval. The landscape plan shall serve to soften the visual impacts of the development and shall utilize native drought tolerant and fire resistant vegetation.

- Exterior lighting shall be minimized. Lighting that is necessary should be of low profile design. Low pressure sodium vapor lamps should be used in the development. Reflective surfaces should be moderate and not used in large expanses in a single plane. Non-glare glass shall be used throughout the project to reduce intrusive glare.

- Utility lines shall be undergrounded.

4.3 TRAFFIC, PARKING, AND CIRCULATION

EXISTING SETTING

Site. The proposed project is located northeasterly of the intersection of Skyline Boulevard and Balmoral Drive (see Figure 4.3-1). Site topography varies from gentle slopes to low hills, with a few areas of steeper gradients. Current development is limited to a few residences on or near its periphery. The existing road system is comprised of a single lane unimproved road between the northerly property line and the tennis court, as well as driveway extensions to the various residences.

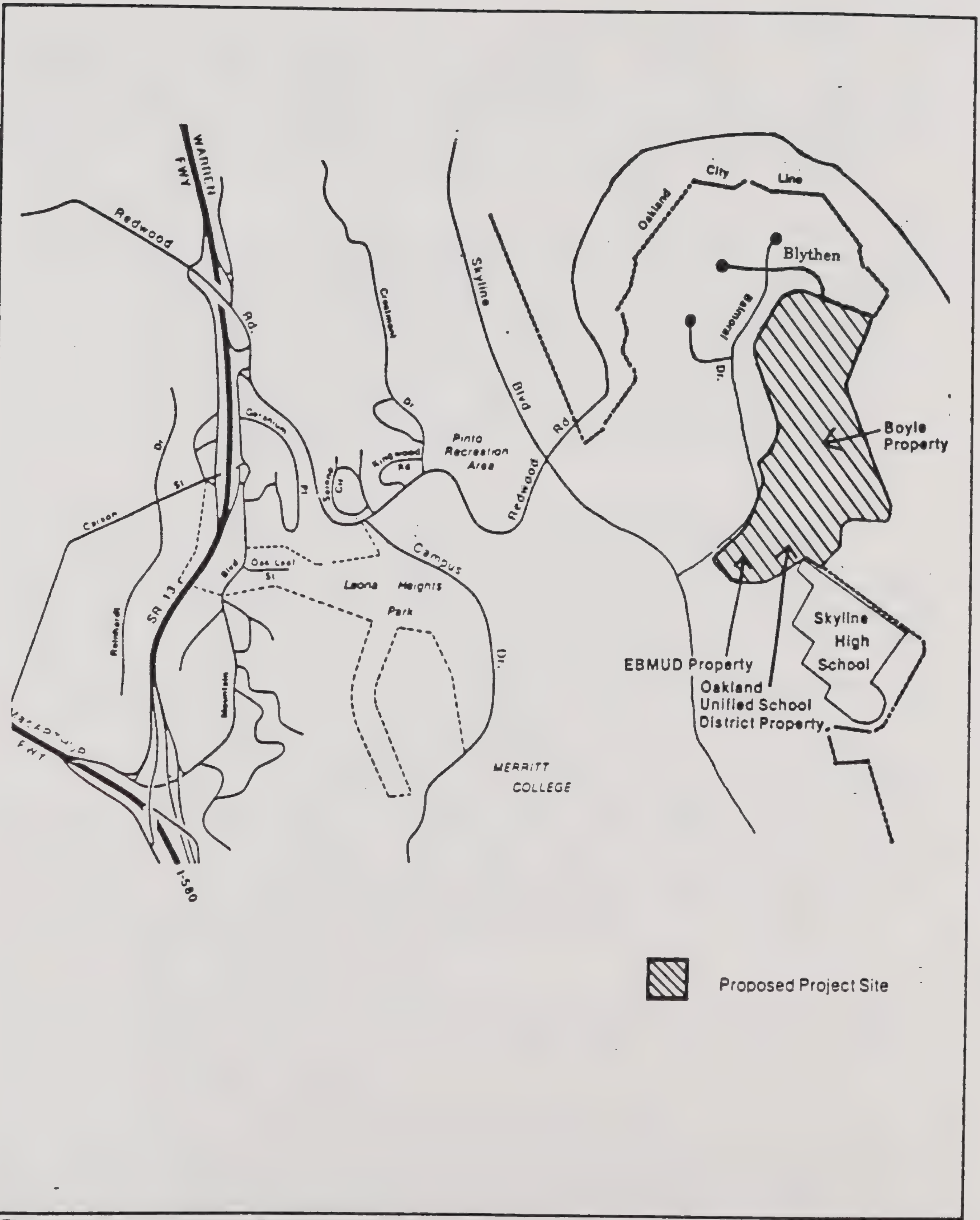
Local Access Roads. The primary road access to the project is off of Balmoral Drive. Balmoral Drive is a two-lane street with a curb-to-curb width of 38 feet and with sidewalks on both sides. It is not a through street, ending a little over one-half mile northerly of its intersection with Skyline Boulevard. It functions as a collector for four cul-de-sac streets. A prior traffic study for the project site estimates 112 single-family residential units in the tributary area of Balmoral Drive, creating a traffic volume of approximately 1,200 vehicles per day north of the Skyline Boulevard intersection (Thompson, 1988).

There are parking restrictions on Balmoral Drive northerly from Skyline Boulevard to Tartan Way. The first 630 feet prohibits parking at any time. From that point to Tartan way, parking is prohibited between the hours of 8:00 A.M. and 4:00 P.M. on school days.

An emergency project access road is proposed extending to the easterly end of Blythen Way. Blythen Way has a roadway width of 38 feet with curb, gutter, and sidewalk. Because of its short length and the limited number of residential units, traffic volumes on this street are correspondingly low.

Arterial Streets. Two major arterial streets are located within the project's impact area: Skyline Boulevard and Redwood Road. In this area, Skyline Boulevard is a four-lane divided roadway with a planted median varying from 10 to 20 feet in width. The median is converted to left turn lanes at most intersections. Current traffic volumes average about 5,600 vehicles per day (City of Oakland Counts - Thompson Engineering Counts) on this stretch of the highway, well within the capacity of its geometric section. Skyline Boulevard intersects Redwood Road at approximately four-tenths of a mile west of Balmoral Drive and continues northwesterly, skirting the edge of the Oakland metropolitan area. To the southeast it terminates at Grass Valley Road near the south city limits. In between, it crosses Keller Avenue, which is an arterial street to the west, with an interchange at Interstate 580 (I-580-MacArthur Freeway).

Redwood Road has a four-lane section and a raised median island. From Skyline Boulevard, it runs to State Route 13 (SR 13 - Warren Freeway) and to I-580. At Jordan Road, a short distance west of SR 13, Redwood Road becomes 35th Avenue and continues into the Oakland central area.



earth metrics

SCALE

FIGURE 4.3-1 VICINITY ROADS

Source: CERTIFIED/Earth Metrics, 1992

Freeways. The bulk of regional trips to and from the project area will use the SR 13 and I-580 freeways. SR 13 has four lanes and carries a daily volume of 50,000 vehicles on an average weekday. I-580 has an eight-lane section, with an average daily volume of 180,000 vehicles. The shortest route to both freeways from the project area is via Skyline Boulevard to Redwood Road and westerly on Redwood Road to the respective interchanges.

Current Operations. In describing traffic conditions on the adjacent street system, the convention of level of service (LOS) will be used. The LOS represents a method of linking the quantity of traffic flow to the quality of flow. As defined in the Highway Capacity Manual, the LOS of a given element or elements of the system is a theoretical volume as determined by its physical and operational characteristics and by stipulated conditions of traffic flow. Levels of service, in turn, are derived from volume/capacity ratios. See Table 4.3-1 for detailed definitions of LOS and their corresponding volume/capacity ratios. In an urban area, the LOS are calculated at intersections, since these are the critical factors in the streets' operations.

Two intersections located near the project site were analyzed for current operational conditions - Balmoral Drive/Skyline Boulevard and Skyline Boulevard/Redwood Road. Both intersections are controlled by traffic signals. Traffic volumes generated by the project are relatively light, and would have no measurable impact on intersections at further distances than the above. In calculating the volume/capacity ratios, turning movement counts taken for the Thompson report were used for base data. At the Balmoral/Skyline intersection, the A.M. and P.M. peak traffic periods occur when Skyline High School classes begin and end. The morning peak falls between 8:00 and 8:30 A.M., and the evening peak lasts for 30-45 minutes between 3:00 and 4:00 P.M. (see Figure 4.3-2). Traffic volumes on Skyline Boulevard and on Redwood Road were updated by an annual increment factor of 1 percent to account for background growth. No changes were made to Skyline High School volumes since enrollment has been fairly stable since the Thompson counts were taken, nor were they made to Balmoral Drive traffic. The current intersection volumes are shown in Figure 4.3-3. The calculated volume/capacity ratios for these intersections all fall well within the LOS A range, and operations at both are considered satisfactory. Some delay can occur during the peak periods of morning and afternoon high school traffic activity. These, however, are of short duration, seldom exceeding one cycle.

Records from the city's Transportation Engineering Division show that there were four reported accidents over the last three-year period (Sobrero, 1992). This is substantially fewer than the number considered critical by current standards or in current practice.

Transit. The A/C Transit District has two routes on Skyline Boulevard, with a bus stop at Balmoral Drive. The V Route is a transbay route to San Francisco; the portion of this route on Skyline Boulevard, however, is scheduled for elimination in September 1992. Route 46 has a south terminal at the Coliseum and a north terminal at Fruitvale and Montana Boulevard. This line has 15 minute headways during the peak commute hours and 30 minutes during off-peak hours from 6:00 A.M. to 8:00 P.M. Daily ridership is 1,500 passengers overall (Horvath, A/CTD 1992).

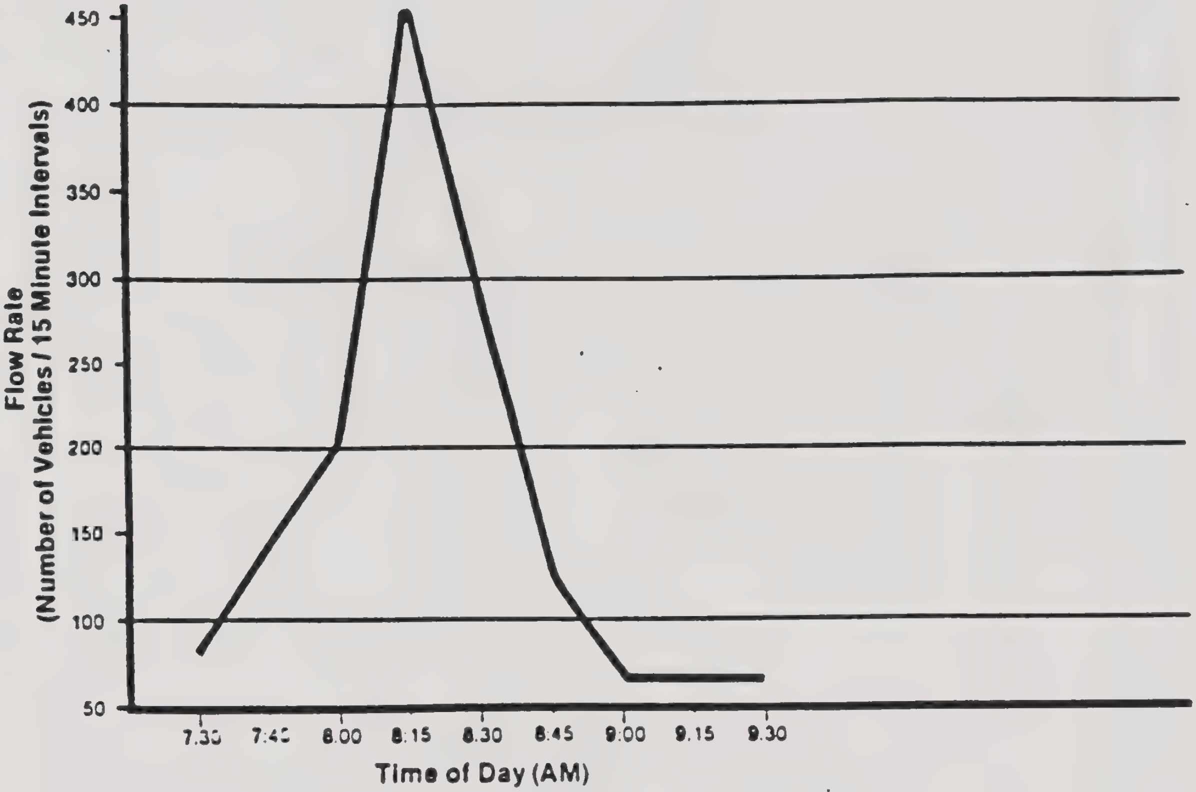
Table 4.3-1. DESCRIPTIONS OF LEVELS OF SERVICE FOR SIGNALIZED INTERSECTIONS

LEVEL OF SERVICE (LOS)	DESCRIPTION	AVERAGE VEHICLE DELAY (SECONDS)	VOLUME TO CAPACITY RATIO (V/C)
A	**Free Flow.** No approach phase is fully utilized by traffic and no vehicle waits longer than one red indication. Insignificant delays.	0-5	0.0-0.59
B	**Stable Operation.** An occasional approach phase is fully utilized. Many drivers begin to feel somewhat restricted within platoons of vehicles. Minimal delays.	5.1-15	0.60-0.69
C	**Stable Operation.** Major approach phase may become fully utilized. Most drivers feel somewhat restricted. Acceptable delays.	15.1-25	0.70-0.79
D	**Approaching Unstable.** Drivers may have to wait through more than one red signal indication. Queues develop but dissipate rapidly, without excessive delays.	25.1-40	0.80-0.89
E	**Unstable Operation.** Volumes at or near capacity. Vehicles may wait through several signal cycles. Long queues form upstream from intersection. Significant delays.	40-60	0.90-0.99
F	**Forced Flow.** Represents jammed conditions. Intersection operates below capacity with low volumes. Queues may block upstream intersections. Excessive delays.	greater than 60	1.00 and above (a)

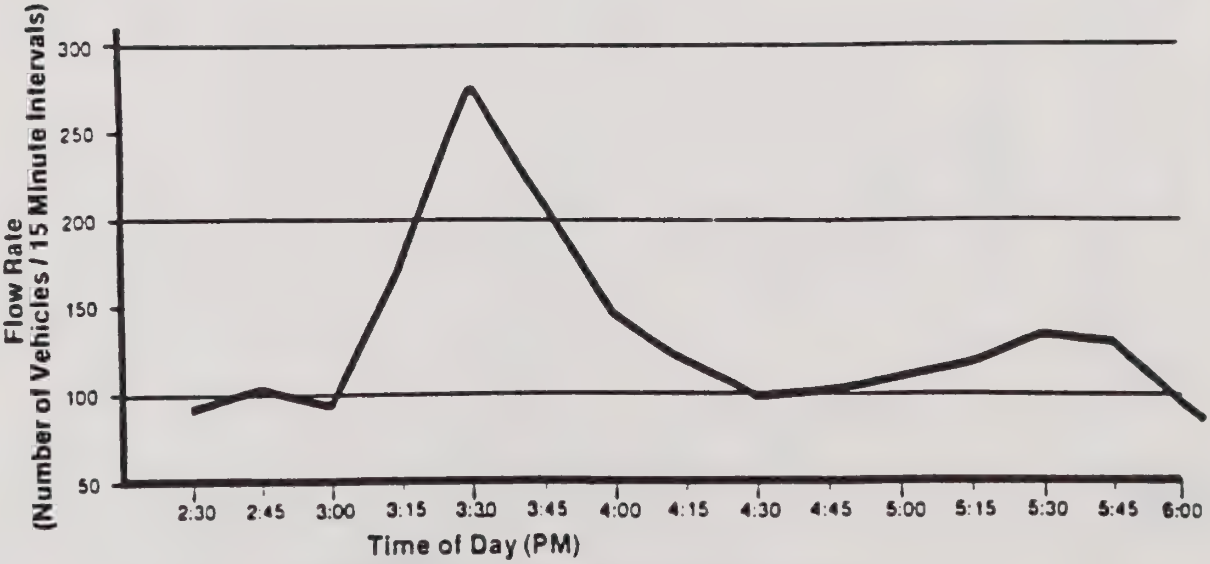
(a) Forecast volumes may produce V/C ratios greater than 1.00, although actual volumes cannot, by definition, exceed capacity except for short periods of time.

Sources: "Highway Capacity Manual," Transportation Research Board, Special Report No. 209, Washington, D.C., 1985.

"Interim Materials on Highway Capacity," Transportation Research Board, Circular No. 212, Washington, D.C., January 1980.



AM PEAK HOUR TRAFFIC ON SKYLINE BOULEVARD



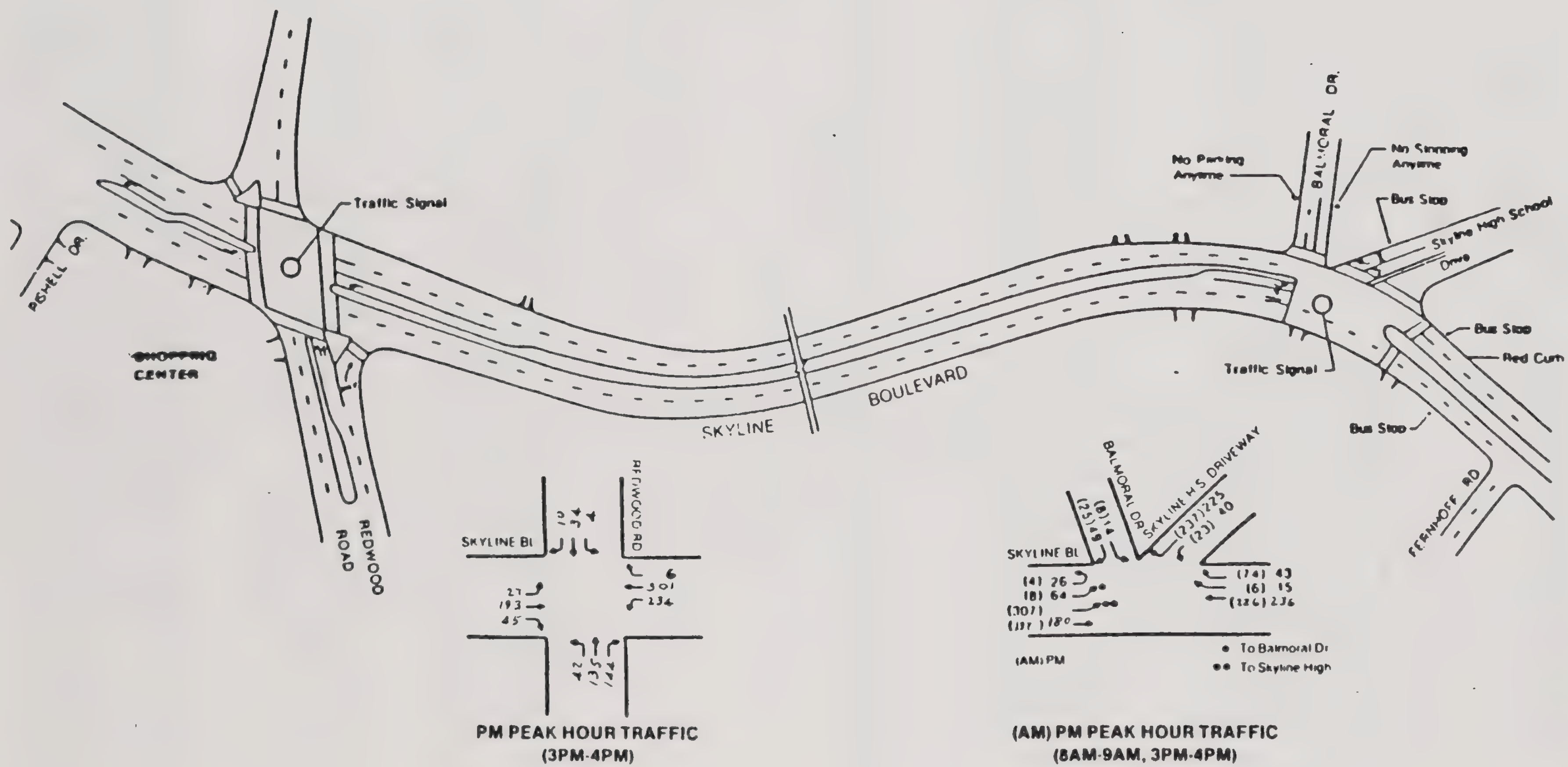
PM PEAK HOUR TRAFFIC ON SKYLINE BOULEVARD

earth metrics

No Scale

FIGURE 4.3-2 VARIATION OF ONE WAY TRAFFIC VOLUME DURING THE AM AND PM PEAK PERIODS

Source: John Forristal, 1992



earth metrics

SCALE

FIGURE 4.3-3 EXISTING ROADWAY GEOMETRICS AND PEAK HOUR TRAFFIC

Source: John Forristal, 1992

AC Transit also provides service to Skyline High School during the arrival and departure times. Approximately 20 bus trips to and from the school are made during each of these periods.

IMPACTS OF THE PROPOSED ACTION

External Streets. The project proposes 44 single-family residences and a maintenance supervisor's apartment. The annexation would also include the Markley property, for a total of 46 units. Since traffic from the two occupied homes on the PUD site and the Markley property are existing, the net gain would be 43 units. Trip generation is based on 44 units, or one more than proposed, for a worst case analysis. The daily and peak hour trip generation rates for these units and the resultant traffic volumes are listed in Table 4.3-2.

The trips were distributed on the external street system in conformance with the locations of major areas of attraction and with the current turning movement counts. These indicated that 77 percent of the current trips were oriented to the west on Skyline Boulevard and 23 percent to the east. The increases in traffic were added to the Balmoral/Skyline and the Skyline/Redwood intersections in accordance with the derived distribution patterns.

Other approved or pending projects in the general site area could contribute more trips to the above intersections. The city (Fahy, 1992) supplied the following list of developments in this category:

Project	P.M. Peak Hour Trips
Oakcrest	34
Oak Knoll Vista	46
Montebello Terrace	70
Merritt College	60

These trips were assigned to the two intersections based on trip generation and distribution data contained in their respective traffic reports. The increases in intersection traffic for the Redwood Creek Village's project and for the cumulative projects are listed in Table 4.3-3. The critical lane volumes are those used in volume/capacity analysis and are more indicative of actual operations.

None of the traffic increments will lower the LOSs below their current level A. The impact of project trips on the external street system, therefore, would be negligible. It is also noted that project traffic on Balmoral Drive will be limited to the 750 feet between the Village Entrance Road and Skyline Boulevard.

On-Site Circulation and Parking and Street Design Features. The site circulation system and on-street parking areas are shown in Figure 4.3-4. While the streets composing this system are private, the city applies its standards for public facilities as guidelines for construction and geometric details. Since the site is in a hill area, roadway design must consider other factors - excessive cut or fill, tree removal, and other environmental

TABLE 4.3-2. PROJECT TRIP GENERATION

Average Weekday Trips at 10 trips per unit	440		
A.M. Peak Hour at 7.6 percent of ADT	Total - 33	In - 9	Out - 24
P.M. Peak Hour at 10 percent of ADT	Total - 44	In - 28	Out - 16

Source: Trip Generation Rates, Institute of Traffic Engineers, 1982.
Trip Generation Research Counts, CALTRANS, 1970 et. seq.

TABLE 4.3-3. INCREASES IN P.M. PEAK HOUR TRAFFIC

INTERSECTION	TRAFFIC VOLUMES - PERCENT INCREASES EXISTING	PLUS Project	CUMULATIVE
Balmoral/Skyline			
	VPH	VPH % Increase	VPH % Increase
Total	974	1,018 - 4.5%	1,036 - 6.4%
Critical Lane	607	633 - 4.3%	642 - 5.8%
Skyline/Redwood			
Total	1,175	1,209 - 3.9%	1,227 - 4.4%
Critical Lane	566	578 - 2.1%	587 - 3.7%

* Vehicles per hour

earth metrics

SCALE

FIGURE 4.3-4 REDWOOD CREEK VILLAGE, ROADWAY AND PARKING PLAN

Source: Michael Boyle, 1992

concerns. The roadway sections for project hillside roads are consistent with those used by other jurisdictions in the Bay Area. A search for publications on this subject at the Institution of Transportation Studies Library, U.C. Berkeley, failed to turn up any general guidelines or suggested standards for this type of roadways.

Following are the proposed geometric design features of the project streets:

- Village Entrance Road is 40 feet in width with two 16-foot traffic lanes and an eight-foot raised median island. There is a five-foot sidewalk on the northerly side. This section extends 120 feet into the site, at which point it turns 60 degrees left as Village Park. The latter travel section is 24 feet wide with a 90-degree parking bay on the westerly side. Sidewalks are provided on both sides. Vertical grades are relatively flat.

  The Entrance Road intersects Balmoral Drive 720 feet northerly of Skyline Boulevard. The sight distance southerly to Skyline is unimpeded. To the north, vertical sight distance is approximately 280 feet, or to the center line of Tartan Way. These are adequate stopping distances for speeds of 40 miles per hour according to prevailing standards (ASSHT, 1984).

- Village Road has a roadway section varying in width from 24 to 28 feet. On the 24-foot section there is no parking; on the 28-foot section, parking is allowed on one side. No sidewalks are proposed on either section. At its northerly end, Village Loop narrows to 20 feet, serving as an emergency road connecting to Blythen Way. There is no parking on the roadway, but there are two angled parking bays adjacent to the traveled way. A total of five residences will abut this portion of the street. At the north property line, the road will be gated, available only to emergency vehicles. This gated feature will require specific review and approved by the city, which currently anticipates that through traffic will be provided on Village Road from Balmoral to Blythen. Grades range from 1.0 percent to one short stretch of 18.0 percent.

- Village Loop is a one-way street, leaving Village Park east-bound and looping back west-bound to reintersect Village Park approximately 220 feet to the north. The roadway section is 20 feet. Parallel parking on one side would be provided at those intervals where roadside conditions and grades permitted. The maximum grades as shown on the preliminary profile sheets (see Figure 4.3-6) are 17.0 percent uphill and 20.00 percent downhill.

- Swing Place is a short cul-de-sac, 150 feet long off Village Loop serving three residences. It is 28 feet wide with parking on one side. The vertical grade averages 12 percent.

- Loop Court is a 20-foot-wide cul-de-sac with no parking, extending some 80 feet off Village Road. It provides access to three residences, and the vertical grade averages 5.0 percent. The short (50 foot) road leading up to the turnaround, however, is a 20 percent grade.

- Village Place is a cul-de-sac off Village Loop with a 20-foot width and no parking. The vertical grade is slight. It extends 160 feet and serves four residences.

City Policy. In communication with the City Council regarding streets in the hill area (Amendments to the Emergency Order, 1992), city staff recommended criteria for widths and parking restrictions. Following are two excerpts from that document:

"The current standard for new streets in Oakland is 26 feet; few streets in the fire area come close to this width. Therefore, staff has conducted a street by street analysis to determine adequate standards for the fire area. For designated evacuation routes where two lanes of traffic area needed, the minimum unobstructed roadway width is 20 feet. For other streets that need to be used as emergency vehicle response routes, the minimum unobstructed roadway width is 14 feet. On all other residential streets, 12 feet is considered a minimum unobstructed road width.

"To obtain the minimum street widths and improve public safety, the basic criteria for restricting parking in the fire area are as follows:

(a) evacuation routes: parking will be restricted on both sides of streets that are less than 24 feet wide and on one side of streets that are 24 to 30 feet wide.

(b) emergency vehicle response routes: parking will be restricted on both sides of streets that are less than 20 feet wide and on one side of streets that are 20 to 26 feet wide.

(c) other residential streets: parking will be restricted on both sides of streets that are less than 18 feet wide and on one side of streets that are 18-24 feet wide. There will be no restrictions on streets that are wider than 24 feet.

The project streets are to be private, and therefore subject to some discretion in the establishment of roadway sections. However, all these streets meet or exceed the criteria of the above document. Village Loop is 20 feet wide with parking on one side, but it is a one-way street with a single traffic lane. Village Road is 24 feet wide with two traffic lanes and no parking (see (a) above). There is one interval of 28 feet with parking on one side. The cul-de-sacs all are 20 feet wide with no parking. The entrance road is wide enough to handle two traffic lanes in each direction by encroachment on the median should the situation require. The emergency extension to Blythen Way is 20 feet wide with no parking, and is in conformance to the above city recommendations.

In an interoffice letter the city Traffic Engineering Department (Pickering, 9/16/92) has stated that the 24-foot section on Village Road is not acceptable, and they would prefer the 28 foot section for the entire length.

The vertical grades as shown on the preliminary plan are typical for hill development (see Figures 4.3-5 and 4.3-6). Since the numbers on these figures

are too small to be easily legible, the more relevant ones are as follows: The steepest grade is on Village Loop at 20.0 percent; however, this stretch is less than 200 feet on a one-way street going downhill. The steepest upgrade is 14.7 percent, also for a distance of less than 200 feet. The range of Village Road grades, as noted, are relatively flat, with a short stretch of 16 percent. That portion of Village Road leading to the emergency access with Blythen Way will conform to the profile of the existing unimproved road which has a brief section (about 50 feet) of 17.1 percent. The various cul-de-sac streets have moderate grades and short lengths, functioning more as driveways than as conventional streets.

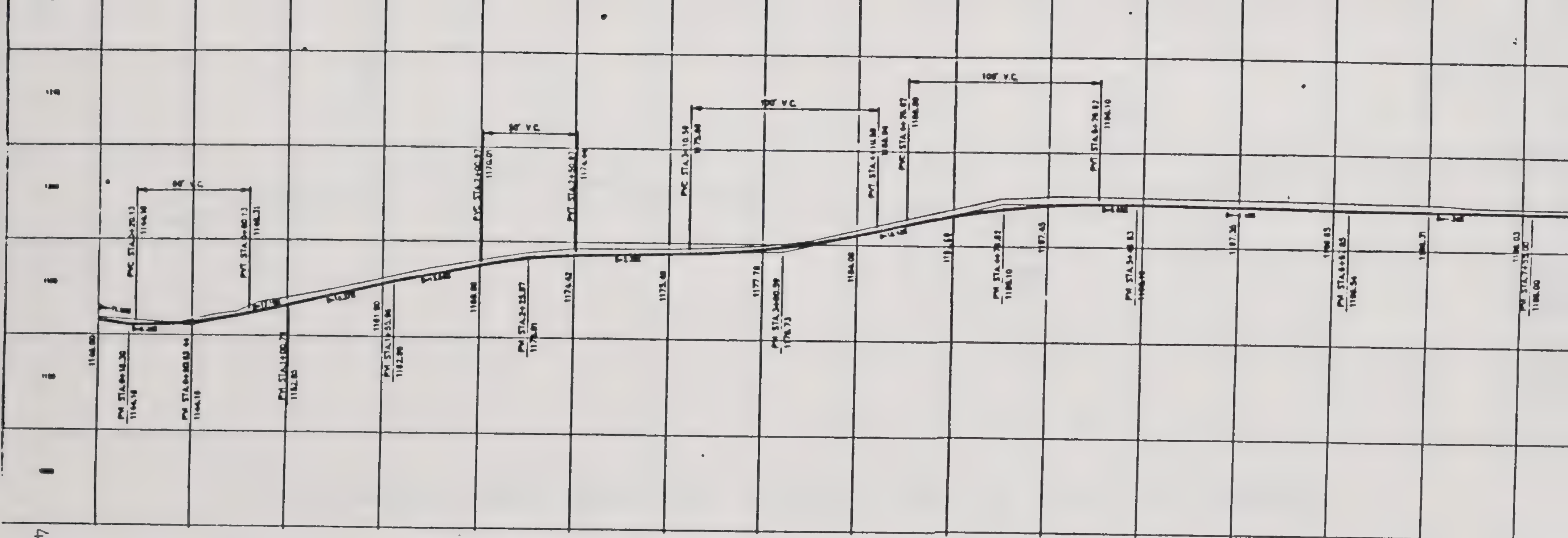
The upgrades can be handled by the trucks that would be using the system. These comprise sanitation vehicles (Cerruti, Oakland Scavenger Company, 1992), moving vans, and emergency vehicles (see Emergency section below).

Pedestrians. With the exception of the Entrance Road and Village Park, no sidewalks are planned for the project streets. This is intended to prevent further intrusion into the adjacent terrain, and to maintain to the degree possible the rustic aspects of the site. The lack of sidewalks is a common feature of hill area streets. The function of a sidewalk is to separate vehicle and pedestrian traffic. Their requirement is largely based on volumes of vehicle and pedestrian traffic. In these cases, vehicle traffic will be very low since the streets are private and trip generation will be limited to the project residences. The maximum traffic volumes on Village Road for example, would be 200 vehicles per day and on Village Loop 150 vehicles per day. This translates into an average count of one vehicle every three minutes on Village Road and one every four minutes on Village Loop during the P.M. peak hour.

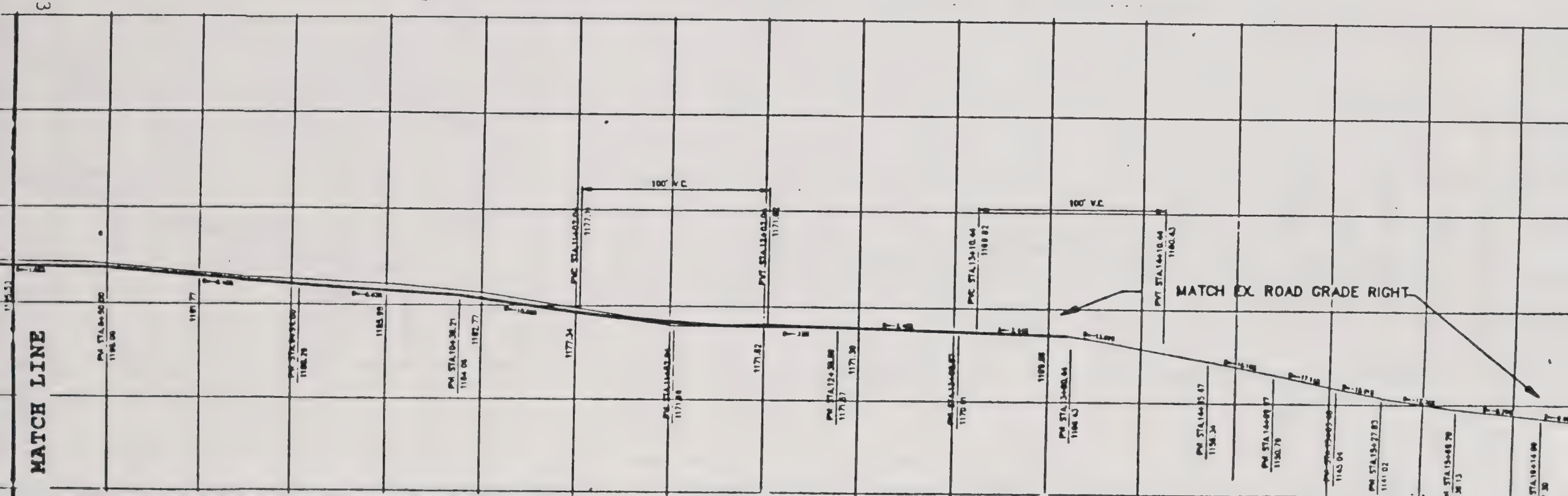
Pedestrian traffic is anticipated to be low, as there are no typical trip attractions, such as commercial, office, industrial, schools (except for Skyline High School), within walking distance. Combined with the adverse grades of some of the streets, this would hold pedestrian traffic to a minimum. Only two walkways are planned for the site: one leads from Village Park to Village Place, and another from Village Road to Village Place. While these would provide a vehicle-free environment for short recreational and functional pedestrian trips, more sidewalks and trails are needed. Attractive pedestrian access to the recreational amenities of the site is of particular importance. The city has requested that sidewalks be provided for Village Road and Village Loop.

Emergency. The horizontal and vertical design features of the project streets are within the capabilities of emergency vehicles (Blueford, OFD, 1992). The vertical grades and the widths and horizontal alignment of the roadway present no unique problems. Actually, the sharpest curves will be at the 90 degree intersections, which are endemic in an urban/suburban area. The cul-de-sacs have 50-foot diameters in accordance with city ordinances. The configuration of the residential driveways on the cul-de-sacs would also function as "hammer heads" to aid in turning maneuvers.

In the case of a major disaster, the situation on Balmoral Drive and Skyline Boulevard would be similar to other street systems in the hill area, and probably better than most. The addition of project vehicles to the streets



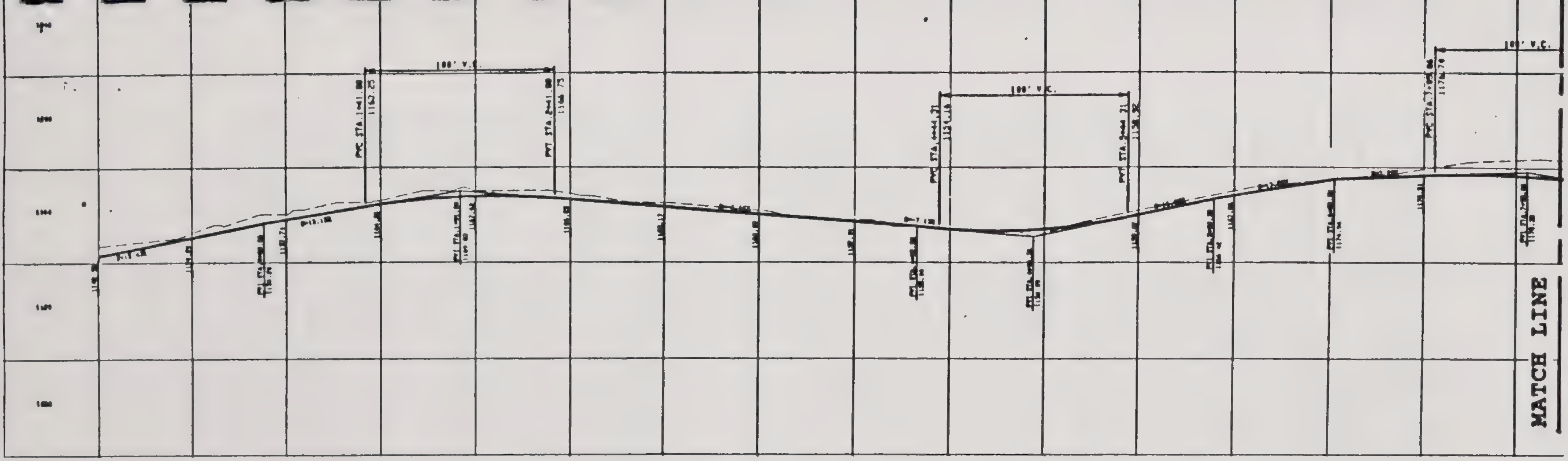
VILLAGE ROAD PROFILE (NOT TO SCALE)



NOTE: VERTICAL SCALE EXAGERATED (2.5 X's)

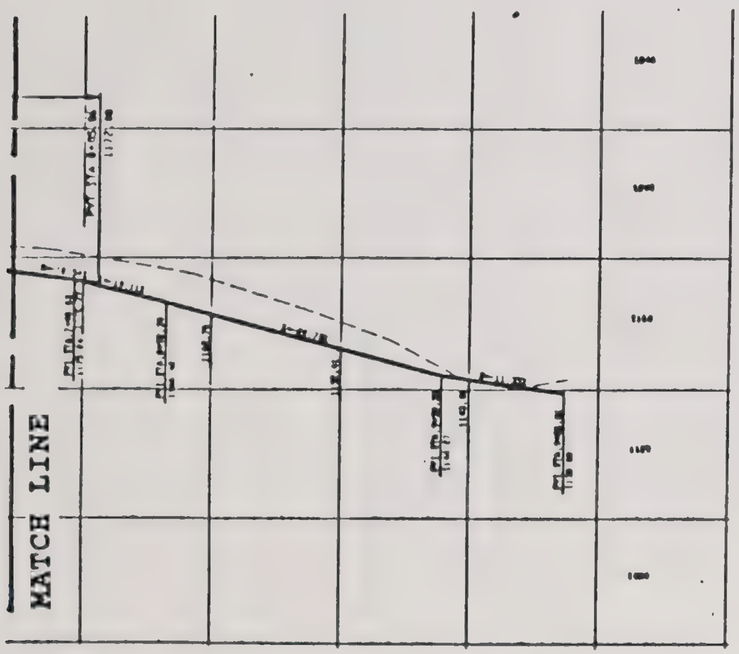
FIGURE 4.3-5 VILLAGE ROAD PROFILE

Source: John Forristal, 1992

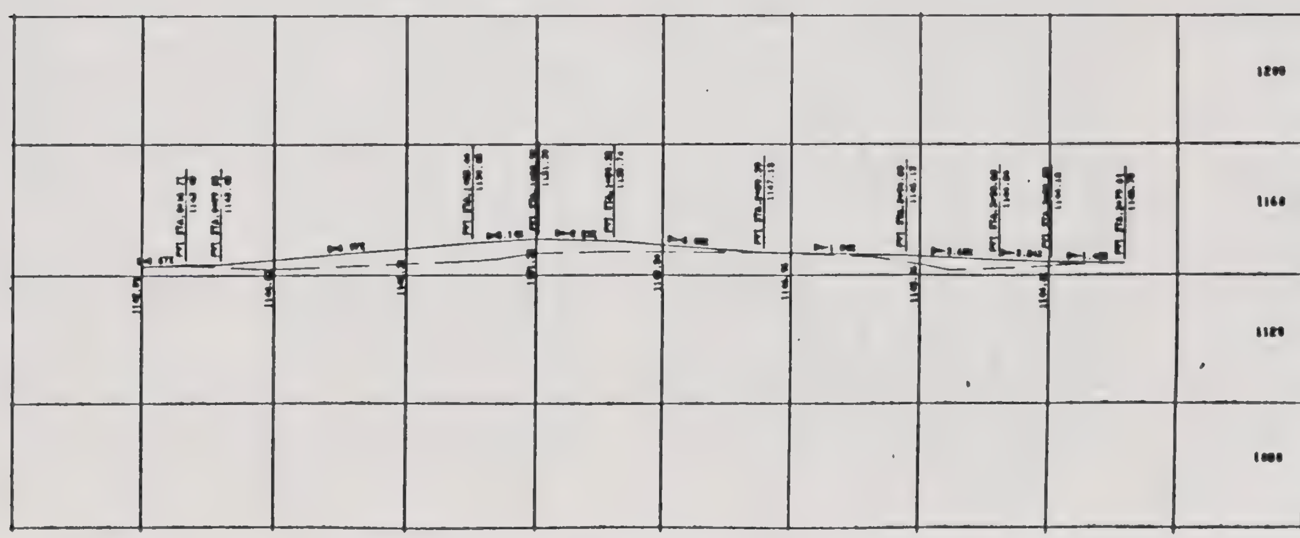


VILLAGE LOOP PROFILE (CONT'D BELOW) (NOT TO SCALE)

NOTE: VERTICAL SCALE EXAGERATED (2.5 X's)



VILLAGE LOOP PROFILE(CONT'D)



VILLAGE PARK (FROM ENTRY CIRCLE NORTH)

FIGURE 4.3-6 VILLAGE LOOP PROFILE/VILLAGE PARK

Source: John Forristal, 1992

would be too few to make any discernable difference in emergency operations. It is noted that parking on Balmoral Drive is restricted from the Entrance Road to Skyline Boulevard, thus assuring the availability of the full roadway width of 38 feet for emergency and residential vehicles. It is further noted that Village Road is effectively a parallel facility to Balmoral Drive between the Village Entrance Road and Blythen Way. Should Balmoral Drive be blocked between these two points, Village Road could serve as a bypass facility for emergency vehicles to the upper Balmoral area, and for residents leaving the area. However, because the plan calls for the community to be gated (will required city approval) this would not be readily available as an emergency route. Eliminating the gates would allow Village Road to serve as a bypass to the upper Balmoral area. As previously described, Blythen Way will serve as an emergency access point to the northerly terminal of Village Road. If the community is gated, the gates should be equipped with an opening mechanism available to the outside public, such as a well marked button.

Construction Vehicles. Construction vehicles will use local streets during the build-out period of this development. The section of that part of Balmoral Drive below the Entrance Road was last paved in 1966 (Osalbo, 1992), and has been subject to routine maintenance during the ensuing period. There are no visible defects in the pavement at the present time. The structural design of on-site streets would be based on two factors - the R factor (cohesiveness of the basement soil) and the Traffic Index (the number of recurrent truck axle loads over a 20-year period). Since the latter would be virtually zero, no meaningful Traffic Index can be computed; the basic structural sections, therefore, should conform to city design policy for such facilities.

Parking. The preliminary project plan parking space tally is shown in Table 4.3-4.

A review of 1980 census data (latest available at this time) was made on the "vehicles available per dwelling unit" category of the tracts adjacent to the project tract. Considering only those four tracts with the highest numbers of vehicles, the average number of vehicles per unit was 2.1. The census data made no distinction between off-street and on-street parking.

The city requirements for off-street parking depends on the zoning designation. In the R-10, R-20, and R-30 Zones, the minimum requirement is 2.0 spaces per unit. For visitor parking, the requirement is one space per five units (Fahy, 1992). The number of spaces to be furnished by the development exceeds both of the above requirements by a substantial margin.

Figure 4.3-4 shows the locations and numbers of on-street parking spaces. In order to be utilized, these spaces should be reasonably close to the dwelling units they serve. As located on the plan, all but one of the residential units are less than 200 feet from an ancillary parking area. This should be an acceptable distance - put in perspective, it is two or three resident frontages. The steepest stretches of roadway may prove a short inconvenience for pedestrians, but this is typical in hill areas.

TABLE 4.3-4. PARKING SPACES

Enclosed parking	118 spaces
Paved Apron parking (residential unit sites)	79 spaces
On-street and off-street bay parking	60 spaces*
Total	257 spaces
Space per residential unit	5.8 spaces
Off-street spaces per residential unit	4.5 spaces

* Includes tennis court parking.

MITIGATION MEASURES

External Street System. Traffic operations on the external street system would not be significantly affected by the addition of project trips. The two critical intersections analyzed in this report are controlled by traffic signals, which would be the only mitigation measure feasible in this situation. Consequently, no further modifications to the external streets are indicated.

On-Site Street System. The proposed on-site street system is in conformance with standard engineering practices and the relevant policies of the City of Oakland, but several further mitigation measures are nevertheless recommended.

- The type and location of regulatory and/or warning signs should conform to the standards set forth in the Uniform Manual and the CALTRANS Traffic Manual. The regulatory signs would be of primary concern; these would include stop and yield signs, one-way street signs, speed signs, and parking signs. A complete signing and pavement marking schedule should be compiled after the street and pedestrian system has been determined.

- A speed limit of 20 miles per hour is proposed for the project. Since the street system is private, this limit would not be enforced by the Oakland Police Department, but would be the responsibility of the Homeowners Association. Speed bumps should be installed, if necessary, to assure that automobile traffic speeds are maintained at a safe level.

- Where parallel parking is allowed on streets with steeper grades, vertical curbs should be installed to allow crimping of the wheels. In fact, the city has stipulated that all curbs be vertical curbs

(Pickering, Interoffice Letter, 9/16/92). A clear space behind the curb should be provided for alighting passengers. The city has requested that sidewalks be provided along Village Road and Village Loop. Conversely, the median island curb on Entrance Road should use a mountable curb so that the island could become a part of the roadway section if required during an emergency.

Transit. At the present time and under current conditions, it does not appear that transit service could be considered a viable travel option. The impending elimination of the V Route (Transbay) would support that contention. The majority of possible transit passengers would be the "reverse commute" - domestics and other service providers to the project area. Most of these, it is assumed, would be picked up at the Skyline Boulevard bus stop, since the distances and adverse pedestrian provisions would discourage walking to and from the bus stop.

Alternate Routes. The feasibility of site access from Redwood Road to the north has been investigated and ruled out. The terrain is far too steep, the construction impacts would be unacceptable, and it would have to cross regional park lands.

Pedestrian

- Provide additional sidewalks and trails, including pedestrian paths on sidewalks to the tot lot and connecting more of the several residential areas, including Village Road and Village Loop.

Site Access

- The locked gates should be removed from the project or if the community is gated, the gates should be equipped with an opening mechanism available to the public, such as a well marked button.

4.4 GEOLOGY AND SOILS

EXISTING SETTING

A limited soil/geotechnical report was prepared for the proposed project by Globe Soil Engineers in December of 1990; an addendum, focusing on slope stability, was prepared in January of 1992 (geotechnical report in Appendix D). The report contains specific information and recommendations regarding the geologic conditions at the proposed project site. This section of the EIR is based on these engineering investigations as well as other published sources.

Geologic Setting. The project site is located on a ridgeline in the Oakland hills, which are part of the Coast Range Geomorphic Province (Coast Range). The geomorphology of the region is characterized by northwest-trending ridges, separated by incised, relatively narrow valleys (see Figure 4.4-1). This hillside terrain resulted from plate tectonic movement and crustal strain accumulation, causing the hills to uplift. The slopes have been further shaped by geologically-recent stream down-cutting, landsliding, and soil creep.

The Coast Range consists predominantly of sedimentary rock types underlain by rocks of the Franciscan formation and a granitic sequence. Rock outcrops of these types are found throughout the Oakland-Berkeley hills. To the east of the Hayward fault, sandstone and shale with minor amounts of conglomerate predominate. Sandstone, shale, chert, greenstone, and metamorphic rock types are exposed in close proximity to and within the Hayward fault zone. Other soil materials in the project site region consist of alluvial and colluvial deposits of sands, silts, clays, and gravels (LSA, 1990).

The majority of the project site is currently rural residential and moderately vegetated with a variety of grasses shrubs and trees (see Section 4.6, "Biotic Resources"). Slopes on site range from approximately 0 to 30 percent. Soil engineering surface reconnaissance in 1990 found no evidence of major cracking, surface faulting, shrink swell reaction, or soil creep on the project site (Globe, 1990).

Site Geology, Soils, and Erosion. Millsholm silt loam on 50 to 75 percent slopes is the only soil formation mapped on the proposed project site by the Soil Conservation Service (SCS). This soil formation is classified by the SCS as well drained with moderate permeability, very rapid runoff, low water holding capacity, with a very severe erosion hazard and low shrink-swell potential (SCS, 1975). No evidence of source erosion was found on-site by surface reconnaissance. Geologic maps indicate that this surface soil layer is underlain by layers of sandstone and siltstone of the Joaquin Miller Formation (Kjm) and the Oakland Conglomerate (Ko). Site drainage flows towards Redwood Creek or Balmoral Drive via four drainage swales (see Section 4.5, "Hydrology").

Eight exploratory borings were drilled on the project site by Globe Soil Engineers to confirm published soil and geologic data and determine soil and rock content and composition. Soils were found to generally consist of a one

earth metrics

N

SCALE

1" = 2000'

FIGURE 4.4-1 TOPOGRAPHIC MAP

Source: USGS, Oakland East 7.5 Quadrangle, 1959

to four foot layer of soft to firm silts and clayey silts with rock fragments over weathered sandstone and siltstone bedrock. These soils possess a low to medium plasticity and low expansion potential. Bedrock layers were predominantly weathered and fractured sandstone with some siltstone. Groundwater was not encountered in any of the exploratory borings (Globe Soil Engineers, 1990).

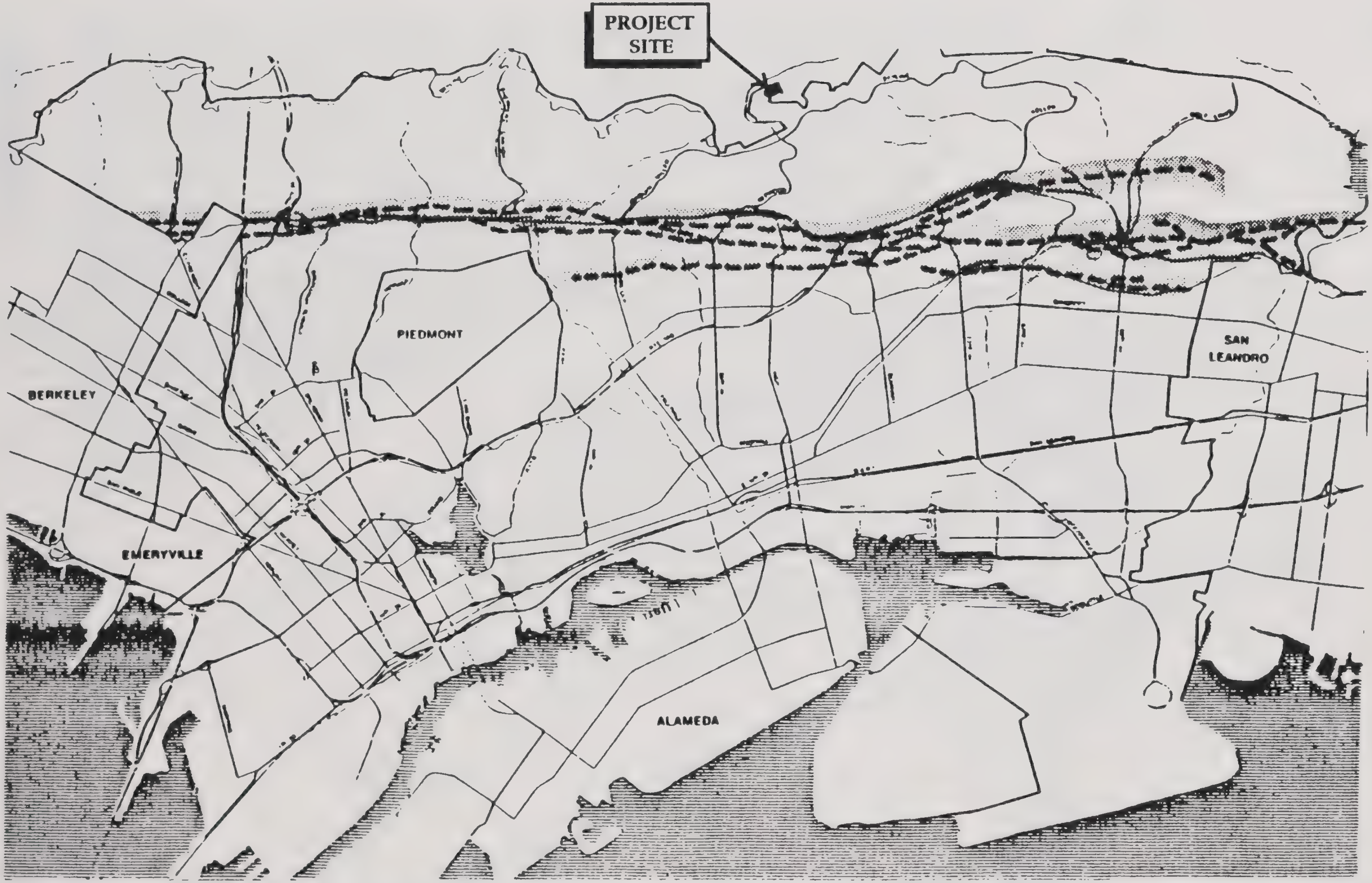
Seismology. Pursuant to the Alquist-Priolo Special Studies Zones Act, the State of California has delineated Special Study Zones (A-P Zones) around active and potentially active faults in California. The proposed site lies outside of the Alquist-Priolo Special Study Zone designated in Oakland (see Figure 4.4-2). There are no known faults located on the proposed project site; however, as is the case all over the Bay Area, the site is located in the vicinity of many active and inactive faults (see Figure 4.4-3). Table 4.4-1 lists the major faults near the site. Many faults in the Bay Area are active and could create intense ground shaking at the proposed project site.

The entire City of Oakland has been designated by the U.S. Geological Survey (USGS) as seismic safety zone four. Zone four has the greatest risk of earthquake-related damage. The Hayward and San Andreas Faults are considered the most likely faults to create large earthquakes in the San Francisco Bay Area. The Hayward fault is located approximately one mile to the southwest of the project site. In the past 200 years alone the Hayward Fault has produced two magnitude 6.8 earthquakes and the San Andreas Fault has produced one earthquake of magnitude 6.8, two of magnitude 7, and one of magnitude 8. The USGS estimates a 28 percent probability for a magnitude 7 earthquake on the Hayward Fault between 1990 and 2020. A 23 percent probability has been estimated for a magnitude 7 earthquake on the San Francisco Peninsula segment of the San Andreas Fault between 1990 to 2020 (USGS, 1990). The Chabot fault (located less than 0.2 miles from the project site) has been classified as inactive because of no recorded movement along this segment in the Holocene period (most recent geologic period).

City of Oakland General Plan. The City of Oakland has goals to minimize the loss of life, injuries, and damage of property of Oakland citizens resulting from natural disasters and the recognition of natural environmental hazards in planning for the city's future development. The following policies from the Safety and Seismic Safety Element of the General Plan apply to the proposed project.

- Programs should be established and appropriate actions taken to insure a reasonable level of safety from geologic, seismic, and fire hazards within Oakland, based upon due consideration of individual property rights and consistent with investment of community resources in preventative programs.

- Except where adequate, corrective measures can feasibly be taken, construction should not occur over known faults or on land subject to landslide, erosion, or flooding. The city will make efforts to obtain more information about such hazardous areas, and will consider the imposition of additional controls on development there.

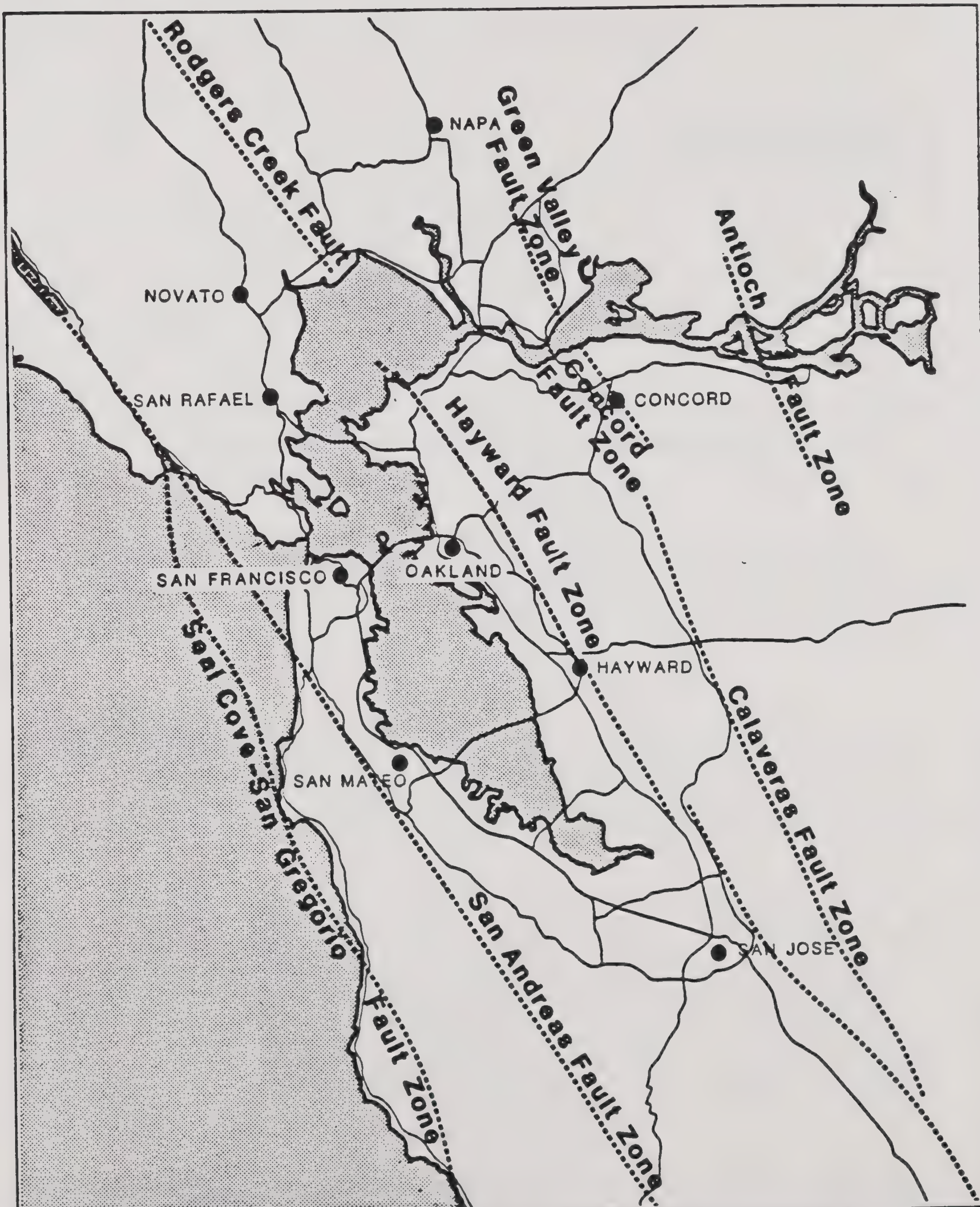


SCALE

FIGURE 4.4-2 STATE OF CALIFORNIA SPECIAL STUDIES ZONE OAKLAND

Source: City of Oakland General Plan-Environmental Hazards Element, 1974

earth metrics



earth metrics

FIGURE 4.4-3 MAJOR FAULT ZONES IN THE SAN FRANCISCO BAY AREA

Source: CERTIFIED/Earth Metrics, 1992

TABLE 4.4-1. MAJOR FAULTS IN THE PROJECT AREA VICINITY

FAULT NAME	DISTANCE FROM THE PROPOSED PROJECT SITE	DIRECTION FROM THE PROPOSED PROJECT SITE
Chabot (inactive)	<0.2 miles	West
Hayward	1 mile	Southwest
Calaveras-Sunol	8 miles	East
San Andreas	20 miles	West

Source: Division of Mines and Geology, Geologic Map of California, 1977.

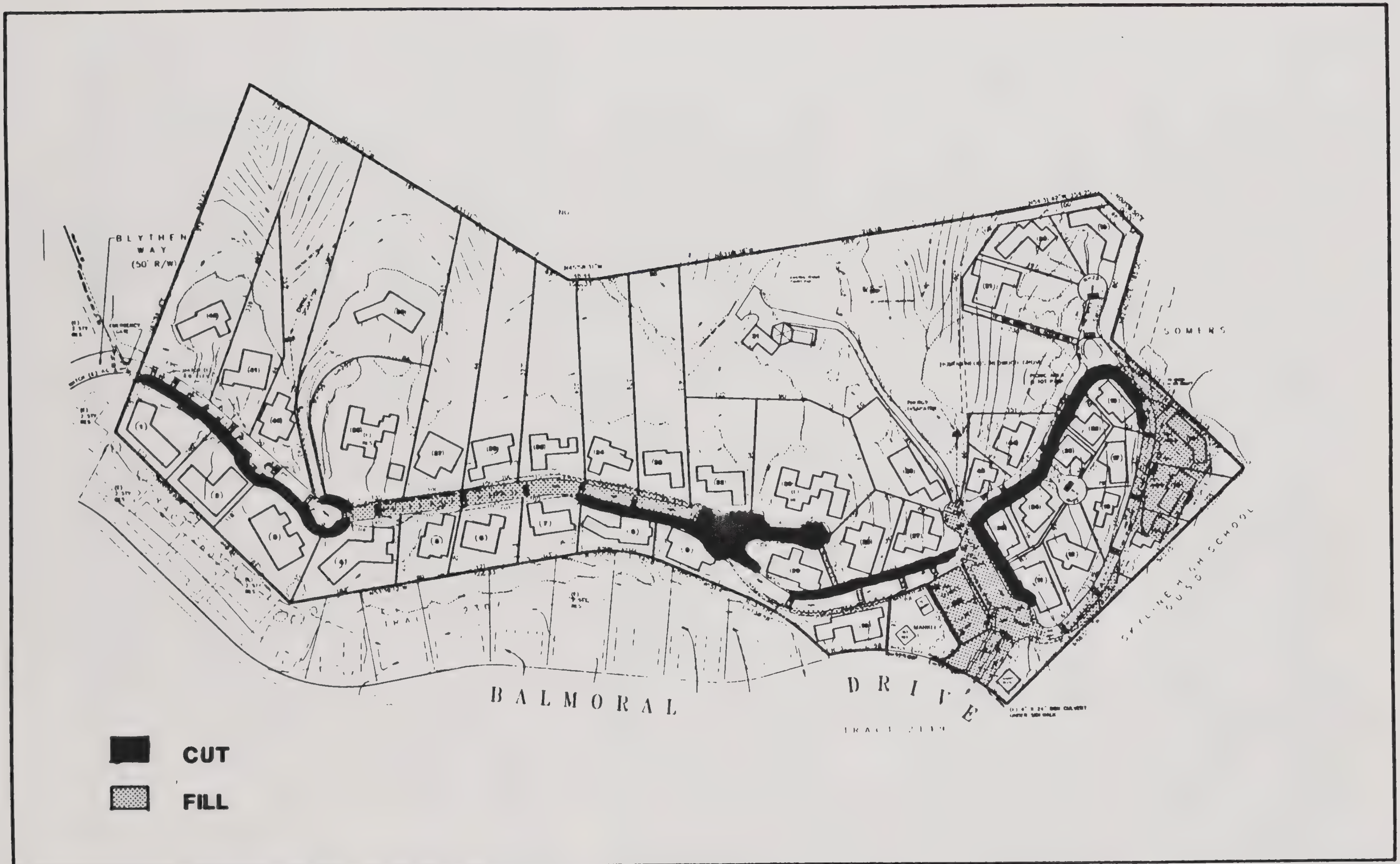
- Development involving significant alteration of natural land forms or surface conditions should generally be discouraged on slopes greater than 30 percent. Where development does occur, graded and natural slopes should be planted to hold easily eroded soil in place and cover unsightly scars.

IMPACTS

Standard of Significance. A project would normally have significant geological impacts if the project would result in inducement of substantial erosion or exposure of people and structures to an unacceptable risk due to major geologic hazards. In addition, the implementation of the proposed project should be in conformance with relevant policies of the City of Oakland General Plan in order to avoid significant adverse environmental impacts.

Topography and Slope Stability. The soil engineers report prepared for the proposed project concludes that the site is suitable for development, provided that the recommendations presented in this report are closely followed. The report further concludes that the potential for landsliding, liquefaction or subsidence of the native soils on the portion of the site to be developed is judged to be low provided all recommendations are followed. Completion of cutting, filling, or other site preparation actions without adherence to generally recognized geotechnical engineering principles could expose future residents to geologic hazards such as landslides or slope failure. This is identified as a potentially significant impact which can be mitigated through implementation of proposed mitigation measures below.

Preliminary grading plans have been completed for the site. A generalized plan of areas of proposed roadway cut and fill is illustrated in Figure 4.4-4. No cut or fill slopes are proposed to exceed the maximum inclination of 2H:1V. The main volume of cutting and filling is proposed along village road and village loop.



earth metrics

SCALE

FIGURE 4.4-4 AREAS OF CUT AND FILL

Source: CERTIFIED/Earth Metrics, 1992

Because the areas of proposed development are relatively gently sloping, the proposed road and community facility preparation would require minimal cutting and filling. In most areas, the cuts and fills will be less than three feet in depth. The area of maximum cut for roads would be in front of sites #7 and #25 and would not exceed seven feet. The maximum cuts for homesites would be for basements and would be about nine feet. The maximum fill depth for roads would be about four feet, and the maximum fill depths for sites would be about ten feet (site #16), with site #14 having a fill of up to four feet and site #15 a fill of four to eight feet.

The applicant's map on grading for the site has been filed with the City of Oakland. The net volume of cut materials is an estimated 5,168 cubic yards, and the net fill volume is 1,679 for the residential sites. The excess of materials from cuts for homesites will be balanced by the excess of fill needed for site roadways, and cuts and fills will be made to balance by the use of areas of flexible fill on the site. The applicant has identified areas of the site (combined sites 14, 15, and 16) to be used as a temporary storage and borrow site for fill, and other sites which can optionally accept fill in order to maintain the balance, such as the entry road and Village Park. Fill would be no deeper than 10 feet.

Grading plans have been identified for each individual lot. Extensive grading activities on the steep slopes of the proposed project site could, under certain conditions, disturb the stability of a slope. Undercutting or overloading a slope during grading will reduce the resisting forces relative to the driving forces of slope failure. Slope destabilization could result in minor sloughing of material or catastrophic mass wasting depending on the degree of destabilization. These conditions could be accentuated by seismic activity or when the materials are saturated with water. Improper grading leading to slope instability on the proposed project site would be identified as a significant adverse impact but applicant proposed measures and mitigation measures in this EIR would prevent impacts from being significant.

Seismology. The proposed site will most likely experience intense ground shaking one or more times during the life of the project. Seismic impacts at the site are expected to be related to ground shaking or landsliding only. Because the site is not located within any special study zones, nor known to be located on any faults, ground rupture is not anticipated on the site. Furthermore, site conditions are not susceptible to liquefaction or subsidence as a result of seismic activity. No areas of the site are identified as being unsuitable for building due to seismic hazards.

Intense ground shaking could result in slope failure on the site. Grading activities could accentuate this possibility. Furthermore, intense ground - shaking at the site could result in severe structural damage. Design of grading plans that increase seismic hazards on site, or design of structures which cannot withstand the expected maximum credible earthquake, would be identified as a significant adverse impact but applicant proposed measures and measures in this section would prevent impacts from being identified as significant.

Soils. Due to the presence of very erodible soils on site, there is the potential for significant adverse impacts due to accelerated erosion,

particularly during the construction phase. Erosion impacts and mitigation measures are discussed fully in Section 4.5, "Hydrology/Drainage" and measures proposed to prevent erosion impacts from being identified as significant.

Impacts from expansive soils are not anticipated on the site. A shrink/swell test was performed to determine the swell properties of the subsurface material. The results show that the soils are of low expansivity meaning that they do not shrink and swell excessively from greater or lesser moisture content (Globe Soil Engineers, 1990), and this is not identified as a significant impact.

City of Oakland General Plan. The proposed project would occur in an area susceptible to landslides as identified in the General Plan. No landslides or landslide morphology were found on the property during field exploration, although there is the potential for sloughing of material during seismic activity. With implementation of mitigation measures proposed by the applicant and measures recommended in this EIR, this project would be consistent with the General Plan.

The General Plan indicates that development involving significant alteration of natural landforms or surface conditions should generally be discouraged on slopes greater than 30 percent. Where development does occur, graded and natural slopes should be planted to hold easily eroded soil in place and cover sightly scars. With measures proposed by the applicant and mitigation measures included in this EIR mitigation, this project would be considered consistent with the General Plan in this regard.

MITIGATION MEASURES

Unless otherwise noted, implementation of the mitigation measures in this subsection, which correspond with identified significant adverse impacts in the foregoing subsection, will reduce impacts to less-than-significant levels.

Topography and Slope Stability

- A certified Geotechnical Engineer shall review the final grading plan, surface and subsurface drainage plans, and foundation plans for the proposed project.

- A final grading plan shall be submitted to the Oakland Public Works Department and obtain the city's approval. The final grading plan should conform to all recommendations in the geotechnical and soils report. Grading permits will be issued only if the grading plan avoids slope stability concerns.

- A Certified Geologist shall be present on-site during all phases of project grading, excavation, and pier and foundation wall installation to ensure that recommendations in the geotechnical report are adhered to.

- The proposed project shall be required to follow the recommendations presented in Phase I (General) Soil / Geotechnical Report (1990)

(Appendix D) and Addendum Soil Report Slope Stability Analysis (1991) (Appendix E) prepared for the project site by Globe Soil Engineers. Specific recommendations include the following:

* Future lot owners intending to build homes on site should be required to prepare Phase 2 geotechnical reports separately for each home site during the design process.

* Foundation design and construction should be performed by an engineer and contractor, respectively, who have ample experience with hillside construction.

Seismology

- The structures of the proposed project shall meet the standards of the Unified Building Code (UBC) adopted by the City of Oakland. The UBC standards ensure structural designs that can withstand the maximum expected ground acceleration.

Soils and Erosion

- The landscaping plan of the proposed project shall be designed to reduce erosion and to cover areas of alteration of natural land forms as specified in the General Plan. The applicant shall be required to submit the landscaping plan to the city for approval. In addition, the homeowners' association shall ensure adequate maintenance of the landscaping. Please refer to Section 4.5, "Hydrology/Drainage" for complete discussion of erosion issues and mitigation measures relating to erosion impacts.

4.5 HYDROLOGY, STORM DRAINAGE, AND WATER QUALITY

EXISTING SETTING

Lynn Bower and Associates, Inc. prepared "Redwood Creek Village Hydraulic Study" (1992) (Appendix F) which addresses existing and proposed drainage on the project site. In addition, the previously referenced Phase I Soil/Geotechnical report prepared by Globe Soil Engineers (Appendix D) (see also Section 4.4, "Geology") contains conclusions and recommendations regarding hydrologic impacts of the proposed project. Much of the data and analysis contained in this subsection is based on these reports as well as other sources.

Drainage. The proposed project site lies largely within the watershed created by Redwood Creek's west fork. The west fork of Redwood Creek collects runoff from the eastern slope of the Oakland Hills before joining the main fork which flows into the Upper San Leandro Reservoir. The Upper San Leandro Reservoir is managed by East Bay Municipal Utilities District (EBMUD) and is a drinking water reservoir for the City of Oakland and other East Bay communities. The EBMUD drinking water intake tower that channels water to the filter plant is in the arm of the reservoir that receives water from Redwood Creek (Owen, 1992). A minor part of the site lies within the Lion Creek catchment in the City of Oakland (see Figure 4.5-1).

"Redwood Creek Village Hydraulic Study" delineates nine main drainage areas on the project site (see Figure 4.5-2 areas A - I). The report also identifies seven areas (points) of storm water concentration (Figure 4.5-1, POC #1 - #7). Approximately 85 percent of the runoff on the site is directed to four intermittent drainage swales (POCs #3, #4, #5 and #6) which lead downslope and feed into the west fork of Redwood Creek. Most of the remainder of surface flows from the site drain in a general westerly direction towards Balmoral Drive before discharging to the upper reaches of the west fork of Redwood Creek. The remaining 15 percent of the runoff from the southern end of the site flows into the Lion Creek catchment. Because the site is on steep slopes at the high end of the watershed, no flood hazards exist on site (FEMA, 1982).

There are currently two single family residences and several paved and unpaved access roads on the site. Most of the site is covered with trees and well vegetated. According to the Soil Conservation Service the soils on site are classified as having a severe erosion potential. However, site investigations by Globe Soil Engineers revealed no evidence of serious erosion (see Section 4.4, "Geology"). Proposed development areas of the project site are generally densely vegetated and gently sloping which reduces the risk of severe erosion.

Water Quality. The East Bay Regional Park District and EBMUD control the land to the north and east of the project site. These lands are designated as permanent open space. The site is bordered on the west by residential uses and to the south by Skyline High School (see Section 4.1, "Land Use and Planning"). Runoff from these existing adjacent uses drain primarily into Redwood Canyon and the west fork of Redwood Creek.

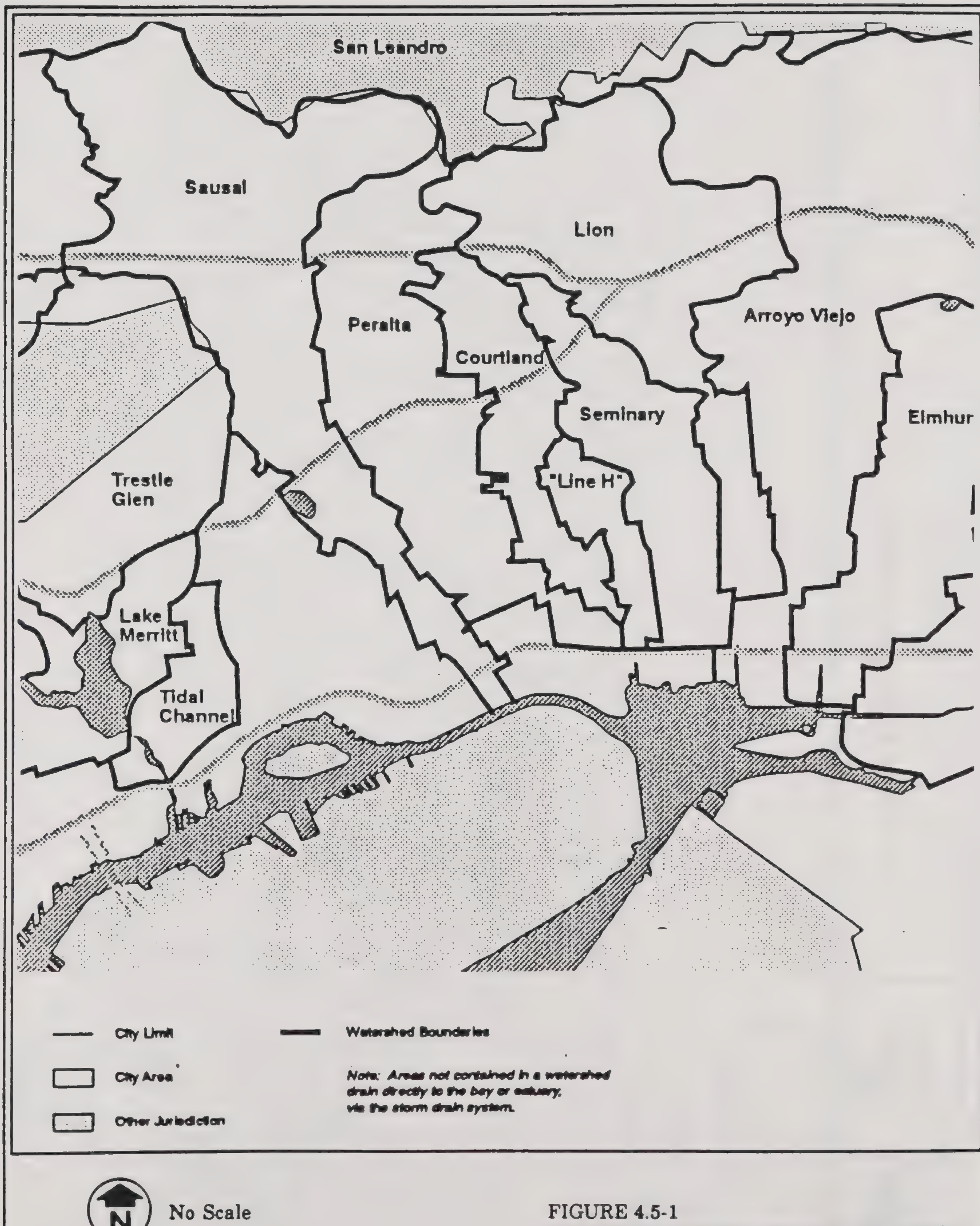
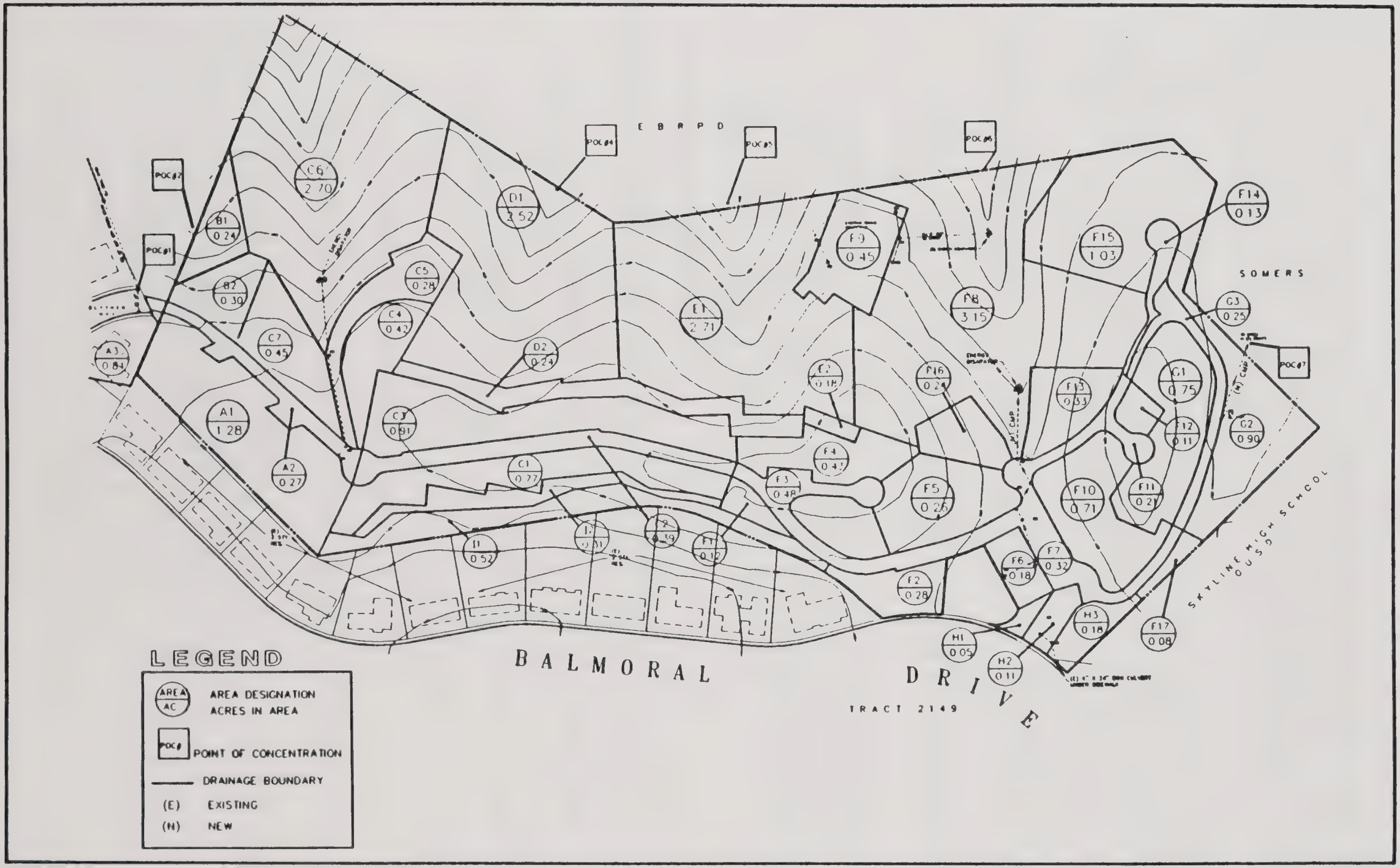


FIGURE 4.5-1
SELECTED WATERSHED BOUNDARIES, CITY OF OAKLAND

CERTIFIED/Earth Metrics

Source: Alameda County Public Works, 1992



earth metrics

FIGURE 4.5-2 EXISTING DRAINAGE

Source: Lynn Bowers & Associates, Inc., 1992

Redwood Creek currently supports a unique population of rainbow trout which would be very sensitive to water pollution (see Section 4.6, "Biotic Resources"). It is likely that there are some pollutants in the runoff generated by the residential and school areas. Potential pollutants found in residential runoff include fertilizers, pesticides, oil and grease, and other chemicals found in household products.

Redwood Creek water pollution during storm events may exceed levels predicted to be toxic to aquatic life for four metals, chromium, copper, lead, and zinc, regulated by the Regional Water Quality Control Board (RWQCB) (EBMUD, 1991). However, the RWQCB does not consider this data to be conclusive nor is it considered to be a comprehensive estimate of water quality conditions in the creek.

City of Oakland General Plan. The following policies from the City of Oakland General Plan apply to the proposed project:

- To the maximum extent feasible, new urban development should be designed to incorporate the natural drainage patterns and to avoid impairing important groundwater recharge areas.

- Development over or immediately adjacent to any stream or body of water should be designed to ensure that water quality is not significantly affected in an adverse manner by soil erosion; by direct discharge of potentially harmful substances; by ground leaching from storage of raw materials, fuel products, or wastes; by floating debris; or by nuisance runoff from washdown facilities.

IMPACTS OF THE PROPOSED ACTION

Standard of Significance. The hydrologic impacts of a project will normally be significant if the project will:

- interfere substantially with groundwater recharge, or use water in a wasteful manner;

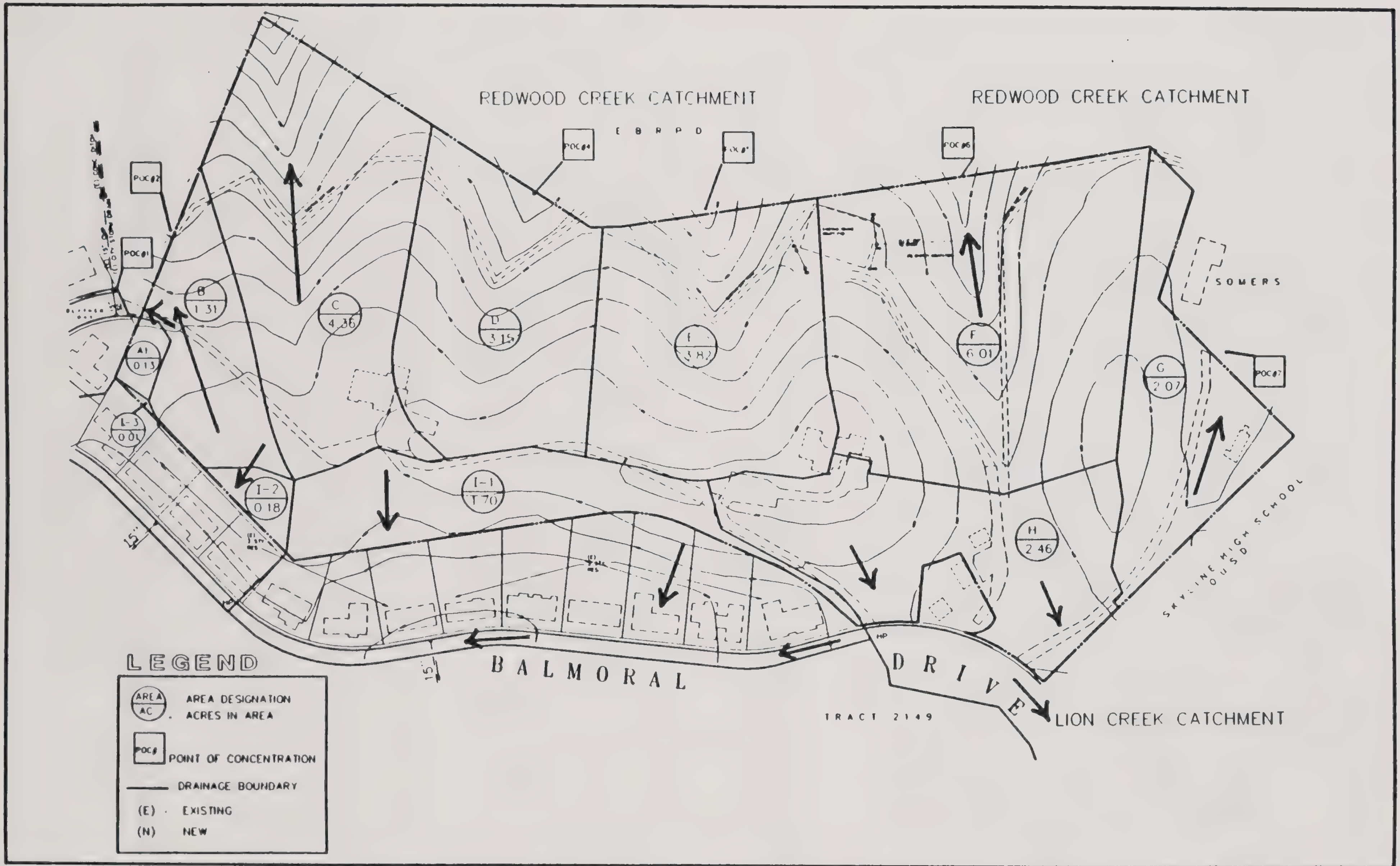
- increase the volume or intensity of storm water runoff beyond the capability of drainage systems;

- cause substantial flooding or expose people or structures to flooding;

- cause substantial erosion or siltation; or

- substantially degrade water quality or contaminate public water supplies.

Drainage. The proposed project would not make significant changes to the existing and mostly natural drainage patterns of the site. The proposed drainage plan for the project is presented in Figure 4.5-3. Drainage infrastructure improvements include installation of rain gutters along the proposed roadways and construction of drainage pipes and energy dissipators in natural drainage swales.



earth metrics

No Scale

FIGURE 4.5-3 PROPOSED DRAINAGE PLAN

Source: Lynn Bowers & Associates, Inc., 1992

Construction of residences, proposed project roadways, and other paved surfaces on site will increase the amount of impervious surface. A civil engineering firm (Lynn Bowers and Associates) has completed runoff calculations for the proposed project which are presented in Table 4.5-1. At the ten year recurrence interval, which is the design storm interval criteria for the project, total overland flow rates are estimated to decrease from 51.04 cubic feet per second (CFS) under existing conditions to 45.84 CFS under the proposed project. This decrease in flow is accounted for by the assumption that the design standards and criteria delays the water on the roof and through the house piping system. Storm water is concentrated and sent laterally down the street (ridge) in curbs and gutters at lower velocities and over longer distances than if it ran directly down hill on steeper slopes. The drainage across existing developed properties along the east side of Balmoral Drive would be decreased. Calculations according to this study indicate that runoff from eight of the nine drainage areas would have no adverse hydraulic impact. The remaining drainage area (POC #1) would experience substantially increased flow velocity which could adversely impact existing storm drain infrastructure. However, the applicant has elected to allow a portion of the water bound for POC #1 to irrigate existing trees by continuing existing sheet flows. Furthermore, existing storm drain infrastructure has been inspected and no evidence of concrete erosion exists in the 15 inch RCP at POC #1.

Increases in velocity at POC #1 are not expected to have an adverse impact on Redwood Creek as, prior to outfalling into the creek, the flow is directed to a 200 foot concrete lined ditch which than empties into a settling basin which absorbs an excess velocity prior to the water flowing into the creek.

Increasing the amount of impermeable surfaces on site will reduce the total amount of water seeping into the ground during wet weather. This would reduce groundwater recharge on the site. However, existing groundwater recharge on the site is limited due to natural drainage into Redwood Creek. The site is located within the Upper San Leandro Reservoir watershed, so runoff from the site would not be lost from local water supplies. Impacts to groundwater recharge are not identified as significant. However, due to increases in urban runoff being discharged into Redwood Creek, potential water quality impacts are critical (see discussion below) both for sensitive aquatic species (see Section 4.6, "Biotic Resources") and since Redwood Creek is a drinking water source.

Increased volume of runoff could significantly increase erosion in the long-term. As runoff volumes increase so will runoff velocities, thereby increasing the amount of suspended solids that can be carried in the runoff. This situation will allow for greater erosion on the site. Erosion could also be increased by changes in the existing drainage patterns on the site. Uncontrolled runoff that is diverted from its natural drainage course may create new drainage courses by eroding unvegetated soils. A project design that does not adequately control vegetation removal and potential erosion would be identified as a significant adverse impact.

Construction and grading activities will temporarily bare soils on site which could significantly erode. Erosion on the proposed project site would not only remove soil from the site but could cause significant siltation

TABLE 4.5-1. EXISTING AND PROPOSED STORM DRAINAGE FLOWS IN CUBIC FEET PER SEASON

POC	5-YEAR RECURRENCE INTERVAL EXISTING FLOW (IN CFS)	PROPOSED FLOW (IN CFS)
#1	0.34	3.81
#2	2.71	0.91
#3	7.03	7.96
#4	6.84	3.12
#5	8.74	4.67
#6	8.73	12.60
#7	1.72	3.42
#8	3.38	0.72
#9	4.00	1.63
Total	43.49	38.84

POC	10-YEAR RECURRENCE INTERVAL EXISTING FLOW (IN CFS)	PROPOSED FLOW (IN CFS)
#1	0.40	4.49
#2	2.59	1.08
#3	8.37	9.36
#4	8.14	3.72
#5	10.40	5.54
#6	10.30	14.80
#7	2.04	4.05
#8	4.04	0.86
#9	4.76	1.94
Total	51.04	45.84

POC	15-YEAR RECURRENCE INTERVAL EXISTING FLOW (IN CFS)	PROPOSED FLOW (IN CFS)
#1	0.43	4.81
#2	2.76	1.16
#3	8.98	10.00
#4	8.65	3.99
#5	11.10	5.89
#6	11.10	15.80
#7	2.18	4.34
#8	4.32	0.92
#9	4.06	2.08
Total	54.58	48.99

POC	25-YEAR RECURRENCE INTERVAL EXISTING FLOW (IN CFS)	PROPOSED FLOW (IN CFS)
#1	0.46	5.46
#2	3.12	1.31
#3	10.20	11.40
#4	9.42	4.53
#5	12.00	6.68
#6	12.50	18.00
#7	2.48	4.93
#8	4.89	1.04
#9	5.51	2.35
Total	60.58	55.70

POC	100-YEAR RECURRENCE INTERVAL EXISTING FLOW (IN CFS)	PROPOSED FLOW (IN CFS)
#1	0.60	6.71
#2	3.86	1.62
#3	12.50	14.40
#4	12.10	5.59
#5	15.50	8.28
#6	15.40	22.30
#7	3.06	6.07
#8	6.04	1.29
#9	7.09	2.91
Total	76.15	68.97

CFS = Cubic feet per second.

POC = Point of concentration as shown on the hydrology maps.

Recurrence interval in years:

"Proposed" refers to the hydrology map shown as "Figure 4.5-1 - Proposed Drainage Plan - Redwood Creek Village";

"Existing" refers to the hydrology map shown as "Figure 4.5-2 - Existing Drainage Plan - Redwood Creek Village"

Source: Lynn Bowers and Associates, Incorporated.

downstream of the site. This would have significant impacts to habitats in Redwood Creek. Please refer to Section 4.6, "Biotic Resources," for discussion of impacts to stream habitats. Construction activities that result in erosion are identified as a significant adverse impact which can be mitigated.

The City of Oakland uses guidelines for erosion control methods developed by the Association of Bay Area Governments (ABAG) to regulate construction activities. Implementation of proper erosion control methods during construction of the proposed project will be monitored by the Oakland Engineering Department and will be a condition of building permits (Grubstick, 1991).

Water Quality. The proposed project could introduce other pollutants into the drainage system and Redwood Creek. The diversion of drainage from natural drainage courses and/or the collection of flows from impervious surfaces have been shown by several studies to increase the levels of some pollutants, most notably metals, that can be toxic to fish and other aquatic life. Some of these metals, lead for example, may come primarily from air deposition. Contact with soils or organic materials greatly reduces the level of these pollutants that remain in the water. Conversely, an increase in impervious surfaces potentially increases the level of pollutants in surface runoff (Alameda County Urban Runoff Clean Water Program, 1991).

Recent studies of non-point source discharges and storm water runoff in portions of Alameda County have also indicated that storm water runoff from urban development, including primarily single-family residential development, frequently exceeds water quality objectives of the State Water Resources Control Board for copper, lead, and zinc. In contrast, runoff from open space areas have been found to have significantly better water quality. Toxicity testing results indicate that dry-weather flows (those flows that occur without storm water runoff) and storm water flows from open space/undeveloped areas tend not to be toxic to aquatic life. However, storm water runoff from urbanized areas tends to be toxic to organisms (Woodward-Clyde Consultants, 1991).

The proposed project's drainage plan would allow storm runoff either to empty directly into the natural drainage swales or to street drainage systems which feed into Redwood Creek. Project site distances to Redwood Creek ranges from 500 to 1,500 feet. Any pollutants entering the natural drainage swales would be partially, if not wholly, filtered through soils and vegetation. Inevitably some pollutants would reach Redwood Creek and potentially impact the sensitive aquatic ecosystem. This is a significant, unavoidable impact from this project.

Adverse impacts may occur due to potential breakage/overflow/blockage of sanitary sewer mains that will be constructed to serve the proposed development. Although this is not likely to occur, the extension of sanitary sewer mains in the area may increase the potential for overflows. Sanitary sewer mains constructed in cross-country easements are more susceptible to tree root intrusion that may lead to blockage. Sanitary sewer mains for this project are proposed to be located in the street areas which provide better long-term serviceability.

There is also a potential for occasional spills or other significant discharges of pollutants into storm sewers. Potential releases include used motor oil, car washing with detergent in driveways, or sewer system leaks. Without measures to reduce the use of or control pollutants on site, cumulative minor releases and one-time releases that are large enough could impact Redwood Creek. Over time, and in a cumulative context, urban pollutants attributable to the project may combine to have a long-term impact on water quality which may result in loss of important aquatic species. Reducing the water quality in Redwood Creek would be considered a significant adverse impact.

Effective October 1, 1992, the State Water Resources Control Board will require a comprehensive application as a part of a new "Storm Water Construction Permit" requirement with fees. The objectives of the permit are (a) to identify pollutant sources that may affect the quality of storm water discharges from the construction site, and (b) to identify, assign, and implement control measures and management practices to reduce pollutants in storm water discharges from the construction site both during and after construction is completed.

The project would be required to apply since it is in excess of the "five acre or more" threshold. Under this program, dischargers associated with construction activities will be required to:

- eliminate non-storm water discharges to storm water systems;

- develop and implement a storm water pollution prevention plan; and,

- perform visual monitoring of discharges to storm water systems.

For the Redwood Creek Village project, a topographic map would be required showing the site and the area of the site where construction activities would take place. Redwood Creek would be shown and the discharge points to the city storm system or other drainage collection system or where such drainage would enter the creek. Also shown would be the location of storm water structures and controls used during construction; areas used to store soils and wastes; areas of cut and fill; drainage patterns and slopes anticipated after major grading activities; areas of soil disturbance; any surface water locations; areas of existing and potential soil erosion; existing and planned paved areas and buildings; locations of post-construction storm water structures and controls; an outline of the storm water drainage areas for each storm water discharge point; and vehicle storage and service areas. The map would also show the size of the construction site in acres and percentage of the site with impervious surfaces.

The application is also required to include narrative description of known toxic materials, treated, stored, disposed, spilled, or leaked in sufficient quantities; management practices utilized to minimize contacts between materials, equipment, and vehicles with storm water; construction materials loading, unloading and access areas; existing storm water structures and controls (if any) to reduce sediment and other pollutants in storm water discharge; equipment storage, cleaning and maintenance areas; and methods of on-site storage and disposal of construction materials. Also included in the

application would be a listing of pollutants that have reasonable potential to be present in storm water discharge in significant quantities and an estimate of the annual quantities of these pollutants in the storm water discharge.

An Erosion and Sediment Control Plan would describe the vegetative practices to be used in various disturbed ares with emphasis on the rainy season. Structural practices for diversion of flows around disturbed areas such as brow ditches, dams, silt fences, rock projections, detention basins, traps, etc. and boundary controls would be included. Controls over entrances/exists to prevent tracking of sediment onto public streets is also required, including daily inspection, maintenance, and cleaning.

The post-construction storm water management would be consistent with local agency requirements, for acceptance, maintenance, and monitoring programs. The requirements are extensive. The Association of Homeowners of Redwood Creek Village would adopt the responsibility of the continued plan of testing and monitoring as required by the State Water Board. This responsibility should be included in the Codes, Covenants, and Restrictions (CC&Rs) for the proposed project.

The requirements, controls, and monitoring required by the permit will undoubtedly demand a high level of water quality from the project's storm water runoff due to the sensitive nature of the receiving creek (see "Mitigation Measures, Water Quality"). Unless the Water Board accepts the pre-construction plan of the overall program, the project could not move forward.

<u>LANDSCAPE WATER CONSERVATION</u>. The need to conserve water has become a permanent feature of the Bay Area, and is particularly important because of the current six-year drought. Unless the proposed development were to follow the Landscape Water Conservation Requirements of the East Bay Municipal Utility District, the development would be identified as having a significant impact on water supplies.

<u>City of Oakland General Plan</u>. The General Plan states that "to the maximum extent feasible, new urban development should be designed to incorporate the natural drainage pattern..." The proposed project would not significantly alter the current drainage patterns and would generally be consistent with this policy of the General Plan.

Even with the implementation of the mitigation measures to control erosion and pollutants the proposed project would be in conflict with the General Plan policy which requires developments immediately adjacent to any stream to be designed to ensure that water quality is not significantly affected. Significant impacts to water quality and sensitive stream species are expected if this project is built. Although this site is not immediately adjacent to Redwood Creek, the endangered species habitat in the creek make it an especially sensitive receiving stream. As discussed above, both erosion and pollutant releases have the potential to significantly adversely affect water quality in Redwood Creek.

While this project is not immediately adjacent to a stream or body of water, the fact that is in a sensitive watershed suggests that it should be consistent with the city policy noted on page 4.5-4 concerning discharge of potentially harmful substances. The applicant has planned for such protection, and in combination with the mitigation measures recommended in this EIR, the project should be consistent with the policy.

MITIGATION MEASURES

The mitigations outlined below will reduce significant adverse impacts, however, significant impacts to water quality and sensitive aquatic species will not be mitigated to less than significant levels even after all mitigations. Therefore, there will be significant adverse impacts to water quality that cannot be avoided should this project be developed.

Drainage. The following mitigation measure should reduce the impacts of increased runoff due to the increase in impervious surfaces on the project site:

- The applicant's engineer should confirm that the existing 15 inch RCP pipe at Blythan Way complies with city requirements. If necessary, the applicant should modify this pipe or replace it to conform with city flood control requirements (see mitigation measure #5 under Erosion below).

- The proposed storm drain system would require the city's review and approval. Modifications of the drainage system, as recommended in subsequent mitigation measures, should be incorporated into the final drainage plan to be submitted for city approval.

Sedimentation. The following mitigation measures should reduce the impacts of sedimentation from construction and grading activities:

- The site erosion control plan should be submitted to the City of Oakland and the East Bay Regional Park District for approval prior to commencement of any grading on the site. This plan should incorporate strict erosion control measures as recommended in the Hydraulic Study (Lynn Bowers and Associates, 1992) and Geotechnical Report with addendum (Globe Soil Engineers, 1990, 1992). The erosion control plan should also be designed pursuant to the guidelines of the Association of Bay Area Governments. Erosion control measures should include at a minimum:

- Grading and excavation activities should be completed on the site between April 15 and October 15.

- Vegetative clearing should be limited to areas where actual structures or infrastructure will be located.

- Bare areas should be mulched, planted with vegetation or treated with a straw and/or jute slope protection matting before the wet season begins.

- Strippings of vegetation and organic top soil during construction should be removed from the site or placed such that they will not create debris flow or erosion hazard.

- Temporary devices such as diversion dikes, hay bales, silt fences, and plastic sheets should be used to control runoff on exposed areas.

- Before grading and construction commences, sediment traps should be installed on the site at all points of entry into Redwood Creek. Sediment traps should be designed to contain any and all erosion that occurs on site before it enters the creek. Routine maintenance and

cleaning of these facilities should be provided for during construction and also on a regular basis by the Homeowners Associations.

- To reduce the potential for storm water and sewer overflows, storm drains shall be maintained properly by clearing debris from the drains annually prior to the rainy season.

- The applicant should develop plans, subject to city approval, for the long-term maintenance of project storm drains.

Erosion. The following mitigation measures should reduce the impacts of long-term erosion impacts:

- Recommended vegetation and erosion control measures identified in the Geotechnical Report and addendum should be strictly followed and incorporated into the final erosion control plan to be approved by the city.

- The storm drainage system and landscaping of the proposed project shall be designed to reduce erosion by limiting bare areas and controlling runoff on exposed soil. All runoff should be controlled and directed away from exposed soils and into existing natural drainages or properly engineered drainages. Runoff directed into existing natural drainage courses shall be designed to dissipate concentrated flow to assure that scour of natural drainage swales does not occur. Energy dissipaters and rip-rap shall be maintained by the Homeowners Association.

- Individual home landscape designs shall be submitted to the City of Oakland Office of Planning and Building prior to approval. Native, drought resistant species that require a minimum of herbicides, pesticides, and fertilizers should be emphasized in landscape plans. The Homeowners Association shall ensure that future residents adequately maintain their landscape.

- Eave gutters and downspouts shall be installed to collect roof water runoff with outlet pipes from the downspouts directed to appropriate outlet locations.

- Energy dissipators shall be placed at storm drain outfalls to minimize erosion and scouring. Riprap should be provided at all intake structures. Energy dissipators and riprap should be designed such that they result in negligible impacts to Redwood Creek and its associated constraints (i.e., flow volume, velocity, temperature, riparian and instream habitats).

- Permanent use of sediment traps shall be employed to contain sediments originating on the developed site before they enter Redwood Creek. Sediment trap should be placed where POC #1 ultimately outfalls into Redwood Creek (after the settling pond). The plan for the design and maintenance of these sediments traps should be included in the erosion control plan to be submitted to the city prior to commencement of construction activities on the site. Sediment traps should be designed large enough in size to allow for adequate settling of sediments prior

to runoff entering Redwood Creek. The Homeowners Association would be responsible for the ongoing maintenance of these facilities.

- Any paved surfaces overhanging unpaved slopes shall be engineered to prevent storm water from flowing off and creating new drainageways. All sheet flow should be directed to the storm drain system.

Water Quality

- A terraced cascade of vegetated retention ponds or other treatment technology to filer pollutants from storm water should be incorporated into the project's storm water system design. The ponds would allow site runoff to percolate into the soil and most metals and other organic constituents would be removed. The retention ponds should be designed to retain the amount of runoff expected from a 10-year storm event. The Department of Fish and Game, the Regional Water Quality Control Board (Region 2), and the City of Oakland should approve the design of the ponds or other technology and the plan for ongoing maintenance. A provision for responsibility for implementation of the maintenance plan should be included in the CC&Rs for the project.

- Oil separators shall be employed in all storm drainage conduits. The Homeowners Association should be responsible for at least annual maintenance of all separators.

- The individual home designs should be designed with outdoor roofed car-ports that drain to the sanitary sewer system rather than the storm sewer system. These car pads should be provided with hoses and clearly labeled as the only place where cars are to be washed or other hazardous materials to be handled. These places are not, however, intended for hazardous materials disposal. The pads should be bermed and sloped such that rainwater does not enter and wash water does not flow out. This will reduce the risk of soap, motor oil or other deleterious materials reaching Redwood Creek.

- The project applicant will be required to obtain a construction storm water permit under the National Pollutant Discharge Elimination System (NPDES) permitting program. The permit should strictly regulate construction waste and disposal measures. Rinsing concrete truck chutes on site would be prohibited. Signs should be posted in construction areas indicating the ecological sensitivity of Redwood Creek. The Regional Water Quality Control Board (Region 2) will make the determination as to whether a general permit or individual permit will be required.

- All storm drains constructed as part of the proposed project should be labeled, either by stamping the concrete curb or by a posted sign, to indicate that the drain flows into Redwood Creek which supports sensitive wildlife species, including steelhead rainbow trout. The sign should indicate, if possible, that only clean storm water should enter the drain and that disposing of, or allowing runoff to carry, silt, household hazardous chemicals such as paint, or any oils or soap, etc. into the drains is prohibited.

- The Homeowners Association should educate residents about the sensitivity of the creek and encourage minimizing the use of pollutants, especially harmful pesticides. The Homeowners Association should further arrange for the biannual sampling and laboratory testing of storm water effluent downslope of the project site, near entry points to Redwood Creek. Sampling should take place during the wet season, one at the beginning of the season, and one at the end. Sample results should be reported to the City of Oakland Planning Department, the East Bay Regional Park District, and EBMUD.

Water Conservation

- Landscape water conservation requirements of the East Bay Municipal Utility District (EBMUD), found in Appendix F of this document, shall be followed.

City of Oakland General Plan. Nonconformity with City of Oakland Policy which requires developments immediately adjacent to any stream to be designed to ensure that water quality is not significantly affected is a significant and unavoidable impact of this project.

4.6 BIOTIC RESOURCES

EXISTING SETTING

Vegetation. A site reconnaissance was conducted in both July 1992 and October 1992 by CERTIFIED/Earth Metrics biologist Naomi Sims to determine habitat types and vegetation on-site (see Appendix I for Dr. Sims qualifications). The biological survey was performed by walking the site in a grid pattern. The applicant's horticultural consultant, Labidie and Associates, also conducted a vegetation survey. The following discussion is based on these and other sources.

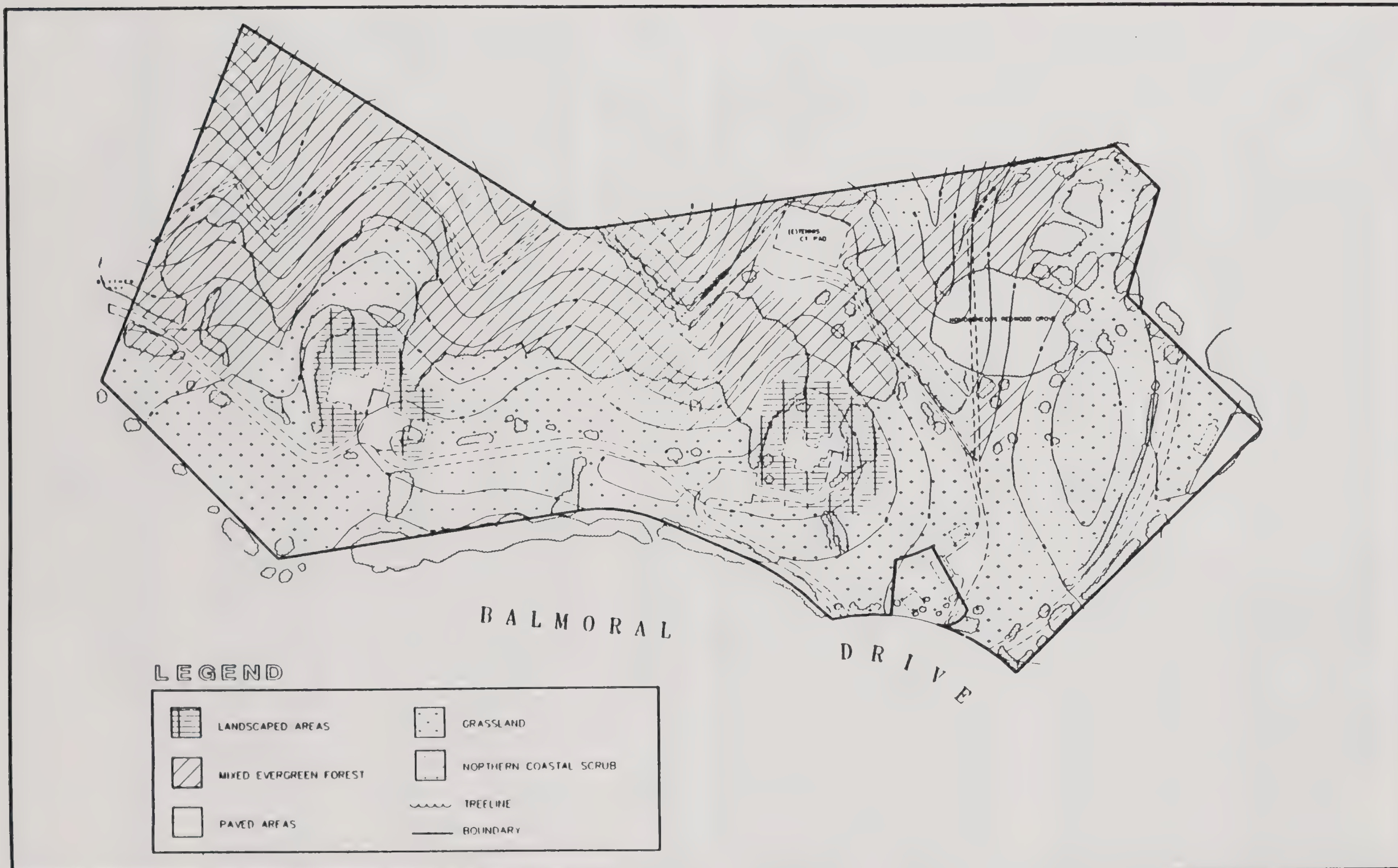
The most southern 4.17 acres of the 30.19 acres proposed for annexation are already developed and include a parking lot owned by the Oakland Unified School District (OUSD) and a water reservoir (Madrone Reservoir) owned by the East Bay Municipal Utility District (EBMUD). Since these parcels are not planned for further development, are landscaped, and support very little native vegetation, this discussion is limited to the 25.62 acre parcel that is proposed for development.

Distinct plant communities found on the project site include mixed broadleaf evergreen forest, redwood forest, northern coastal scrub, and grassland (see Figure 4.6-1). The westerly portion of the project site, where most of the residences would be located, consists of three gently sloping knolls. To the east the site slopes more steeply toward Redwood Canyon and Chabot Regional Park. The gently sloping western portion is primarily grasslands interspersed with small areas of northern coastal scrub and tree groupings. Redwood trees flank ravines in the easter portion, and mixed evergreen woodlands, which include oaks and madrones in the more sunny locations are found on the descending ridgebacks.

The west branch of Redwood Creek, which supports a sensitive population of native rainbow trout, is located approximately 500 to 1,500 feet downstream of the site. Most overland drainage from the site eventually reaches Redwood Creek.

On a regional level, the project site's eastern portion is an extension of woodland habitat from the mostly undeveloped Redwood Canyon, which stretches north, east, and south of the project site. Chabot Regional Park borders the site on its north and east boundaries. Approximately 3/4 mile east of the project site, the east ridge and west ridge trails follow the northwest to southeast ridgeline through Redwood Regional Park. As part of the urban wildland interface, wildfire is of particular concern in the project area. The site would be involved in fuel management programs that may be instituted as a result of the wildfire that occurred in the Oakland Hills in October of 1991. The East Bay Regional Park District (EBRPD) is in the process of creating plans for fuel breaks to the east of the project site.

NORTHERN COASTAL SCRUB. Scrub vegetation on the site is limited to small areas which are interspersed with grassland and oak trees, primarily in the western and southern portions of the site. This plant community is



earth metrics

SCALE

FIGURE 4.6-1 GENERALIZED VEGETATION MAP

Source: Labidie and Associates, 1992.

characterized by the preponderance of evergreen shrub species, 1 to 5 feet in height with semiwoody stems growing from a woody base. Northern coastal scrub communities commonly occur in close association with coastal prairies and sometimes invade these grassland communities. Dominant species include coyote brush (Baccharis pilularis), poison oak (Toxicodendron diversilobum), sticky monkey flower (Diplacus aurantiacus), coffee berry (Rhamnus californica), and yerba buena (Satureja douglassi).

NON-NATIVE GRASSLAND. Areas designated as grassland in Figure 4.6-1 consist mostly of introduced annual grasses. As in most of California, the native perennial grasses on the site have been replaced by introduced grasses such as wild oats (Avena fatua), rye grass (Lolium multiflorum) wild barley (Hordeum spp.), California brome (Bromus carinatus), soft chess (Bromus mollis) and wild mustard (Brassica spp.). Most grassland areas appear to be maintained by seasonal mowing.

MIXED BROADLEAF EVERGREEN FOREST. The mixed broadleaf evergreen forest is characterized by a mixture of evergreen trees, below which is a dense understory of shrubs and herbaceous perennials. The broadleaf evergreen trees found on site are the Pacific madrone (Arbutus menziesii), California bay (Umbellularia californica), and the coast live oak (Quercus agrifolia). Shrubs on site include coyote bush, mountain mahogany (Cercocarpus betuloides), hazel nut (Corylus cornuta var.californica), sticky monkey bush, coffee berry, canyon gooseberry (Ribes menziessi), flowering currant (Ribes sanguineum), poison oak, and California huckleberrry (Vaccinium ovatum). Herbaceous perennials found in this habitat include the Douglas iris (Iris douglasii), yerba buena, western sword fern (Polystichum munitum) bracken fern (Pteridium aquilinum) and the giant chain fern (Woodwardia fimbriata).

REDWOOD FOREST. Nearly homogeneous stands of redwoods (Sequoia sempervirens) are interspersed with evergreen forest along portions of the northeast face of the knoll, overlooking Redwood Canyon. Redwoods also line ravines sloping to the east toward the canyon creek.

Fish and Wildlife. The extensive natural vegetation, particularly the dense woodlands on the project site, provides local wildlife with valuable forage and cover. The habitat value of the dense woodlands on the site is enhanced by the nearby Redwood Creek. Areas in the margins between grassland, scrub, and woodland are known as "ecotones," and are also valuable to wildlife because of the diversity of plant species and available habitat types. Raptors, for instance, prefer such ecotonal areas, since the woodland provides them nesting and perching habitat and the grasslands support rodent prey populations.

Native wildlife species are common since the site adjoins the relatively large open space network that includes Chabot Regional Park, Redwood Regional Park and Joaquin Miller Park. Local corridors of dense native woodland on the site are valuable to wildlife for movement and forage. In addition to providing migratory corridors for wildlife, woodland provides valuable habitat for a number of wildlife species.

Broadleaf evergreen forests and redwood forests observed on the project site support a great diversity of avian species. Birds expected to flourish in

this habitat in the Oakland area include, but are not limited to, the following: red-shouldered hawk, California quail, band-tailed pigeon, western screech owl, great horned owl, northern pygmy owl, common flicker, hairy woodpecker, acorn woodpecker, downy woodpecker, western flycatcher, western wood pewee, Steller's and scrub jay, chestnut-backed chickadee, plain titmouse, wrentit, common bushtit, brown creeper, white-breasted nuthatch, Bewick's wren, house wren, winter wren, American robin, hermit thrush, ruby-crowned kinglet, starling, solitary vireo, warbling vireo, Hutton's vireo, orange-crowned warbler, Wilson's warbler, northern oriole, black-headed grosbeak, purple finch, pine siskin, brown towhee, rufous-sided towhee, lesser goldfinch, white-crowned and golden-crowned sparrow, and song sparrow (Golden Gate Audubon Society, 1982; Peterson, 1961). Various finches, thrushes, and sparrows were noted during the site visits.

A number of different mammals may be found in the woodland as well. Mammals expected to utilize the woodland community on the subject site include the following: opossum, California mole, little brown myotis, California myotis, raccoon, long-tailed weasel, spotted skunk, striped skunk, brush rabbit, desert cottontail, bobcat, Beechy ground squirrel, western gray squirrel, valley pocket gopher, Heerman kangaroo rat, western harvest mouse, deer mouse, brush mouse, dusky-footed woodrat, California vole, gray fox, and mule deer (Burt and Grossenheider, 1976). Large mammals such as the mule deer require larger expanses of natural vegetation for habitat, which the plant communities of the project site and adjoining areas presently provide.

Several species of reptiles and amphibians which have adapted to the woodland habitat may also be found on the subject site. Reptiles expected to utilize woodland habitat in the Oakland area include the western fence lizard, western skink, alligator lizard (northern and southern), gopher snake, common kingsnake, striped racer, sharp-tailed snake, terrestrial garter snake, common garter snake, and the ring-necked snake (Stebbins, 1966).

Scrub areas on the site are used by the above listed species as well. Relative to woodland, these areas provide less forage and nesting habitat, due to relatively less vertical depth, but the native scrub plants are nevertheless valuable to wildlife. Birds such as Anna's hummingbird, bushtit, California thrasher, and brown towhee even prefer scrub to more dense woodlands.

Grasslands support a variety of wildlife as well. Rodents such as pocket gopher, meadow vole, western mole, and western harvest mouse, and grazers such as black-tailed jackrabbit and mule deer may be found in these habitats. Snakes and carnivorous mammals prey on these herbivores, examples of which include common king snake, gopher snake, yellow-bellied racer, and the coyote. Raptors such as red-tailed and red-shouldered hawks would be expected to prey on small rodents in the grasslands, while nesting and perching in adjacent woodland habitats. Birds indigenous to the grassland habitats include Brewer's blackbird, mourning dove, American robin, and California quail. Salamanders, fence lizards, and alligator lizards are expected to thrive in these habitats as well.

<u>Sensitive Species</u>. Rare, endangered, or threatened species are protected by the Federal Endangered Species Act of 1973 (as updated 50C7R 17.11 and 17.12,

January, 1982), the California Native Plant Protection Act of 1977, and the California Endangered Species Act of 1970 (California Administrative Code, Title 14, Section 670.2 and 670.51). CEQA (January, 1984) provides additional protection for unlisted species that meet the "rare" or "endangered" criteria defined in Section 15380 of that act.

The California Natural Diversity Database (CNDDB), administered by the Natural Heritage Division of the California Department of Fish and Game (CDFG), was consulted for records of occurrences of sensitive animals, plants, and natural communities that have been reported in the Oakland Hills. The consultation revealed no reportages of any special organisms or natural communities on the project site. However, because a lack of local reportages does not constitute a negative result, all reports of sightings of sensitive species within a two-mile radius of the project site are considered below.

NATIVE STEELHEAD RAINBOW TROUT. The west branch of Redwood Creek is known spawning habitat for a historically and scientifically significant population of native steelhead rainbow trout (Onchorhynchus mykiss). This trout population was effectively isolated from the ocean in 1875, with the construction of Chabot Dam on San Leandro Creek, downstream of its confluence with Redwood Creek. The upstream construction of Upper San Leandro (USL) Dam in 1926 further isolated these trout on protected watershed lands not open to the general public. Examination of planting records has not provided any evidence that USL Reservoir has ever been planted with hatchery rainbow trout. A genetic study of steelhead rainbow trout in Redwood Creek, conducted in 1990, revealed that their genetic profile strongly supports the contention that they are descendants of native California steelhead (Gall, et.al., 1990). The coastal rainbow trout was originally confined to Pacific coast streams and some interior basins from Alaska to Mexico. Due to the widespread hatchery plantings of hybrid rainbow trout that occur worldwide, this genetically pure strain of native rainbow trout is a unique and valuable resource, becoming increasingly rare from year to year (EBRPD, 1991). Of the adult steelhead in the USL Reservoir, an estimated 80 percent spawn in San Leandro and Redwood Creeks (Alexander, 1991). The west branch of Redwood Creek is therefore biologically and scientifically significant.

The young native rainbow trout are dependent on the small creeks of the San Leandro watershed, including the west branch of Redwood Creek. Adult trout favor the deeper reaches of the USL Reservoir during most of the year. When creeks become swollen with runoff between January and April, adults migrate up the creeks at night to find suitable spawning habitat. They form nests (redds) in pockets of loose gravel where circulating water washes away silt and provides developing eggs with adequate oxygen. While two-thirds of the eggs hatch within a few weeks of spawning, fewer than 10 percent of the hatchings reach maturity. The surviving young live in the creeks for one to two years, growing three to four inches per year, before migrating to the deep water habitat of the reservoir (EBRPD, 1991). On the west branch of Redwood Creek, suitable spawning habitat occurs all along the canyon.

The native steelhead rainbow trout population is also significant from a historical standpoint. The coastal rainbow trout, now established in temperate zones throughout the world, was first described based on specimens collected from the San Leandro Creek watershed which includes the project

site. In 1855, Dr. G.W. Gibbons, founder of the California Academy of Sciences, collected three specimens of coastal rainbow trout from San Leandro Creek, downstream of the project site, and described them as a distinct species, Salmo iridea. The fish population has State Landmark Status, and is registered as California Registered Historic Landmark 970 (EBRPD, 1991). Therefore, the relatively pure strain of native steelhead trout that reside in Redwood Creek are a preserved genetic stock of the population that was originally named "rainbow trout." The trout's unique historical and scientific value makes the protection of Redwood Creek from siltation or urban pollution especially important.

ALAMEDA WHIPSNAKE. The Alameda whipsnake (Masticophis lateralis euryxanthus), considered to be one of the rarest snakes of the East Bay region, is a state-listed threatened species and a Federal Candidate 2 species for endangered listing. Several habitat requirements of the species are presently known. For instance, this species is characteristically associated with coastal sage and scrub chaparral communities, however individuals have been observed in grasslands, open woods, on rocky slopes, and along open streams and arroyos. Specific habitat requirements for the Alameda whipsnake include west, south, and east facing slopes; individuals are not found on cooler, north-facing slopes. In addition, prime habitat for this snake is located within 600 feet of riparian habitat, which is required for breeding (Beeman, 1990). Alameda whipsnakes consume mainly lizards, and especially fence lizards (Sceloporus spp.).

Major threats to Alameda whipsnake habitat include urban development and water impoundment. According to the most recent information, the last large populations of this snake are probably restricted to large expanses of open space, most of which are managed by the EBRPD and the EBMUD (CDFG, 1990). The limited distribution information that is available indicates that this sensitive species does not coexist with urban development. Fuel modification on south-facing slopes is another possible threat. In addition, there is some evidence that biocides have adverse effects on oviporous reptiles such as the whipsnake (CDFG, 1990). The nearest documented presence of the Alameda whipsnake from the site is approximately one mile to the southwest at Leona Park. The nearest recent record (1990) is approximately 2.5 miles to the north of the site, at Eastport (Beeman, 1992).

Based on a field visit by the CDFG, the city advised the applicant to survey the proposed project site for the presence of suitable habitat for the Alameda whipsnake. Such a survey of the site was conducted by a herpetologist and wildlife biological consultant (Beeman, 1992), who concluded that the small amount of scrub habitat on site (approximately one and three-quarter acres) is not sufficient to support substantial prey species for the Alameda whipsnake. Generally a minimum of two acres of suspected Alameda whipsnake habitat needs to be present on a site before any trapping might be required. In addition, the site is approximately one third of a mile from suitable Alameda whipsnake habitat, and is not interconnected with that area. The project site was evaluated using the Beeman/Mullen Habitat Suitability Index System, which yielded a score of 33 probability, placing it in the low/unlikely range for Alameda shipsnake presence (see Appendix I). Beeman concluded that "the Alameda whipsnake is highly unlikely to occur at this site and that trapping for this species is totally unwarranted" (Beeman, 1992).

BERKELEY KANGAROO RAT. Published records of occurrence of the Berkeley kangaroo rat (Dipodomys heermanni berkeleyensis) are from the Berkeley Hills, Mount Diablo, and Livermore Valley. Habitat for Berkeley kangaroo rats, in so far as is known, consists of open, grassy hilltops and open spaces in chaparral and Blue Oak/Digger Pine woodlands (CDFG, 1986). Based on consultation with a species expert (Beeman, 1993), and after further consultation with Joanne Karlton of CDFG (Karlton, 1993), the EIR preparers have determined that the Berkeley kangaroo would not inhabit the project site and additional study for the presence of this species is unwarranted.

CALLIPE SILVERSPOT. The callipe silverspot (Speyeria callipe callipe) is found on open hillsides where the wild pansy (Viola pedunculata) grows (Triden and Garth, 1986). This plant species blooms from February through April. The callipe silverspot has been reported to be found in the Oakland Hills and at Joaquin Miller and Redwood Regional Parks. Even recorded sightings of this butterfly in the Oakland Hills may, however, be in error due to the taxonomic confusion of this subspecies with another subspecies, namely Speyeria callipe comstocki (EIP Associates, 1988).

The applicant's consultant Emile L. Labadie conducted a systematic survey of the project site in March of 1993 (March 8, 15, and 29) and reported that there was no evidence of the wild pansy (see Appendix K).

BAY CHECKERSPOT. The bay checkerspot (Euphydryas editha bayensis) is found in areas of serpentine soil and rock outcroppings in grassland habitats. Its primary food sources are plant species associated with serpentine soils (Garth and Tilden, 1986). Serpentine soils are not found on the project site and therefore this species is not expected to occur on the site nor was it observed during site visits.

BURROWING OWL. The burrowing owl (Athene cunicularia), a formerly common resident throughout much of California, is a small ground dwelling owl of open country, particularly grasslands and a variety of desert habitats. Burrowing owls are found principally in sparse or open canopy situations where there are existing burrows, elevated perches or low vegetation close by and a high percentage of bare ground. The grassland and small areas of coastal scrub were traversed systematically during site reconnaissance using visual sight line transacts. No burrows large enough to be used by burrowing owls were seen and no burrowing owls were observed on site.

ALAMEDA MANZANITA. The Alameda manzanita (Arctostaphylos pallida) is a state listed endangered species and a Federal Candidate 1 species for endangered listing. This endemic plant is considered to be of the highest priority by the California Native Plant Society (CNPS). It is a shrub which occurs amidst chaparral and broadleaved upland forest communities upon steep slopes and barrens of the East Bay Hills in Alameda and Contra Costa Counties. The plant is a highly restricted species with very specific habitat requirements; it only inhabits south and east-facing slopes of 20 to 40 degrees near ridge tops that receive up to 10 inches of additional precipitation from summer fog, and it is limited to sterile mineral soils derived from cherts, siliceous shales, and sandstone. Alameda manzanita is a fire-adapted shrub, requiring periodic fires to remove organic litter, recycle plant nutrients, scarify seeds for germination, and rejuvenate populations. Associated species at some

occurrences include coast live oak, bush monkeyflower, and bracken fern, all of which inhabit the project site.

The Alameda manzanita is extremely rare and threatened with extinction, due to a number of environmental factors. There are approximately one dozen known occurrences, half of which are damaged or declining. One population is protected on Huckleberry Ridge in the Oakland Hills as part of a botanical reserve set up by the EBRPD. Approximately half of the known plants were affected with a root fungus in the early 1980's, and escaped introduced shrubs and ground cover compete with the rare manzanita for light, space, and nutrients. Furthermore, the manzanita suffers from the possibility of genetic introgression from Arctostaphylos cultivars used as landscape plants. The combination of these and perhaps other environmental factors have imperiled the existence of this unique manzanita species.

During the October 1992 site visit, all areas of the site proposed for development were systematically surveyed to determine if this species occurred in areas proposed for development. Two individual manzanita plants were found. It was determined neither of these plants were the Alameda manzanita.

DIABLO ROCK ROSE. In the 1920's a specimen of Diablo rock rose (Helianthella castanea) was reported in Leona Heights Park, approximately 0.5 mile south of the project site, amidst habitat similar to that on the site. However, according to the CNPS and the CNDDB, this plant is presumed extinct in the Oakland Hills, as its occurrence has not been confirmed in the last 70 years. This forb is a Federal Candidate 2 for endangered listing, and is not listed at the state level. The CNPS considers it to be a plant of the highest priority, as it is limited to a few highly restricted populations and is endangered in a portion of its range, threatened by urbanization. The plant is found in grassy areas of foothill woodlands in the San Francisco Bay region, especially in the vicinity of Mount Diablo, and is only conspicuous during its flowering months of April and May. The Diablo rock rose is found at elevations from 500 to 4,000 feet. The project site is located within the forb's elevation limits, at approximately 1,000 feet above mean sea level.

A systematic survey was conducted during March of 1993 at a time when the rose is known to be in bloom on Mt. Diablo (see Appendix K). No evidence of the Diablo Rock Rose was found on the site.

PRESIDIO CLARKIA. The presidio clarkia (Clarkia franciscana) is a state listed endangered species and a Federal Candidate 1 for listing. It has been seen in the vicinity of Skyline Boulevard in Oakland. It is associated with serpentine outcrops and serpentine soils in valley and foothill grasslands. Serpentine does not occur on the project site, therefore this species is not expected to be found on the site.

Fish and Game Code Section 5650f gives the CDFG jurisdiction over the discharge of all deleterious substances, such as soil sediment resulting from construction activities, into the waters of the State of California. The CDFG has jurisdiction over all drainages identified on U.S. Geological Survey (USGS) 7.5 minute topographical maps by blue solid or dotted lines. Intermittent drainages not identified on USGS maps may also be under the CDFG's jurisdiction if they support significant riparian vegetation.

City of Oakland General Plan. The City of Oakland has indicated an objective to manage and preserve native flora and fauna and to protect local rare and endangered species in its General Plan. A primary goal of the General Plan is to conserve the planning area's native vegetation and wooded areas for the protection of aquatic and wildlife habitats. The following policies from the Open Space, Conservation & Recreation Element of the General Plan apply directly to the proposed project:

- Efforts should be made to perpetuate the full range of plant types and plant communities, and therefore also wildlife variety, found in Oakland.

- Special attention should be given to the protection of rare and endangered species.

- Where new development occurs, examples of native vegetation should be retained, and where feasible, large sections should be left undisturbed for ecological, educational, and aesthetic benefit. Where appropriate, the development should incorporate a diversity of suitable new plant materials to provide food and shelter for wildlife.

- As much as feasible, wooded tracts of open land should be preserved, with only careful inroads for development allowed.

- The removal of large live trees, wherever they occur, should be avoided for desirable species of trees.

- Extensive tree planting programs should take place in most residential and commercial areas.

- Wildlife and natural vegetation should be protected from indiscriminate use of dangerous pesticides and herbicides, especially in areas where topography and wind can facilitate the spread of these substances and promote the accidental poisoning of plants and animals.

- Wherever practicable, landscaping should include use of native plant species.

City of Oakland Tree Preservation Ordinance

Upon annexation the project site would be subject to the provisions of the Tree Preservation Ordinance of the City of Oakland. According to this ordinance, protected trees are coast live oaks measuring at least four inches in diameter at breast height (DBH) and any other trees measuring nine inches DBH or larger except eucalyptus, which is not protected by the ordinance. Tree removal permits are required for all protected trees which are to be removed or which are located within 10 feet of the proposed building footprint or perimeter of earthwork.

The ordinance also requires that adequate protection be provided during the construction period for trees planned for preservation. The following are some of the relevant conditions of approval that may be issued in conjunction with any tree removal permit:

- Before the start of any clearing, excavation, construction or other work on site, every protected tree deemed to be potentially endangered shall be fenced off at a distance from the base of the tree to be determined by the tree reviewer.

- Where proposed development or other site work is to encroach upon the protected perimeter of any protected tree, special measures shall be incorporated to allow the roots to breathe and obtain water and nutrients. Any excavation, cutting, filling, or compaction of the existing ground surface within the protected perimeter shall be minimized.

Adequate plantings shall be provided in order to prevent excessive loss of shade, erosion control, groundwater replenishment, visual screening, and wildlife habitat. The tree reviewer may require a landscape plan showing the replacement planting and the method of irrigation.

All applicants for tree removal permits are required to provide a tree survey and site plan which indicates the location, species and DBH of all protected trees located within 30 feet of proposed development activity on the project site and indicating which trees are proposed for removal. The applicant has submitted a survey and site plan (dated July 14, 1992) for a tree removal permit for the proposed project roadways. The tree survey is discussed below.

IMPACTS

Standard of Significance. The biologic or ecologic impacts of this project will be identified as significant if the project will substantially effect a rare or endangered plant, fish, or animal species; will interfere substantially with the movement of any resident or migratory fish or wildlife species; will substantially diminish habitat for fish, wildlife, or plants; or will result in the disposal of materials which will pose a hazard to animal, fish or plant populations in the area.

Vegetation. The tree survey conducted by the applicant and on file in the City of Oakland Planning Department indicates that, worse case, 120 trees will need to be removed for the proposed project roadways. This number includes 73 redwoods, 17 oaks, 3 California bay, 1 madrone and 26 non-native species. Of the 120 trees, 94 are native species for which the Department of Parks and Recreation will require replacement plantings on site or a combination of replacement plantings and in lieu fees if removal is permitted. According to the Parks and Recreation Department, the proposed 94 native trees that require replacement can be replaced in either of two ways: (1) trees removed for road installation will be replanted along the roadway, within 10 to 15 feet of the edge of the pavement. If there is insufficient room an in lieu fee will be charged; (2) trees removed for road installation can be replanted anywhere within the Planned Unit Development, subject to Department of Park and Recreation approval. For any tree for which there is insufficient room to replant an in lieu fee will be charged. Either method will require submission of a landscape plan (Acosta, 1991).

Roadways on the site have been designed to follow existing roadways and pathways. The applicant has indicated that during preliminary tree reviews,

alternative roadway alignments were considered. The currently proposed alignment was chosen to decrease removal of groups of trees and individual specific large oak trees.

The applicant has submitted to the tree reviewer a list of trees for purposes of mitigation planting. These trees include big leaf maple (Acer macrophyllum), California buckeye (Aesculus californica), incense cedar (Calocedrus decurrens), coast live oak, and California bay. Suggested shrubs and ground covers to be used in project landscaping were also submitted. The tree division of the Office of Parks and Recreation reviewed the list submitted by Labadie and Associates and approved the tree species listed and recommended the addition of coastal redwoods (Sequoia sempervirens) and Pacific madrone (Arbutus menziesii). Detailed landscape plans are required to be submitted at a later stage in the planning process.

Although specific lot lines and exact locations of building footprints are not known at this time, a worst case estimate of the number of native trees requiring removal, including the requirements of the fuels management plan for fire safety, was made utilizing the preliminary site plan (see Figure 3.2-3). The method used was to approximate the location of each footprint while on site, and estimate the number of trees required to be removed for building at the indicated location. An estimated 112 trees would need to be removed for the proposed building footprints including redwoods, oaks and madrones. Lot 28 is in heavily wooded redwood grove, and lots 1, 2, and 41 are in an important oak grove. Oak trees are be coming rare in Oakland (their namesake) and are therefore more significant when lost. Three significant individual oak trees will also be lost if the Village Loop Road and Swing Place are constructed as planned. Overall, the loss of 232 mature, protected trees, including three significant individual oaks and a significant oak grove, is a significant unavoidable impact of the project.

The vegetation that would be preserved in the development could be indirectly damaged by construction activities and related changes in the local ecology. Grading and construction activities can have detrimental effects on vegetation by directly destroying roots, compacting soils, causing excavated material to accumulate within the dripline of trees, and producing dust which settles on leaves and needles of adjacent trees, shrubs, and other vegetation. These adverse impacts can be mitigated with careful construction practices and following provisions outlined in the Oakland Tree Preservation Ordinance.

Future residents of the project site may introduce exotic plant species which could displace native vegetation and alter the microclimate inherent to the oak woodland community. Introduction of new plant communities, possibly through vegetation removal and subsequent introduction of exotic species by future residents, would be considered a significant adverse impact.

Wildlife. The removal of 120 trees for road construction and the removal of an additional 112 trees for the establishment of building sites on the project site will modify wildlife habitat, but would represent only about 8 percent of the estimated 3,000 trees on the site. Remaining wooded areas near the project roadways and wooded areas adjacent to lots proposed for development will be less valuable as wildlife habitat due to the increase in human activities on the site during construction and after project build-out. Since most of the proposed lots are clustered in the western portion of the site, the project proposes to preserve large tracts of wooded acreage in the eastern portion of the site. More reclusive wildlife species would be expected to relocate to these areas farthest

from residences. These wooded tracts would be part of privately owned lots. Any fencing at lot lines by homeowners would be detrimental to the movements of some species of wildlife. Domestic pets introduced by future site residents, if allowed to run free could also be disruptive to wildlife.

Project development would eliminate most grassland areas on site. However since this habitat is currently disturbed and not sensitive, this is not considered a significant impact.

Riparian biology associated with the west branch of Redwood Creek could be adversely affected by construction activities if proper precautions are not taken during grading and building operations. Removal of vegetation during grading leads to greater topsoil erosion rates, which if unchecked could result in siltation of Redwood Creek during the rainy season particularly since the site soils are highly erodible (see also Section 4.4, "Geology and Soils" and Section 4.5, "Hydrology, Storm Drainage, and Water Quality"). Particles of nutrient rich topsoil, displaced by rain and runoff, would be carried downslope into the water course, increasing stream turbidity and downgrading water quality. These changes can adversely affect local wildlife, as the principal local water sources may become tainted by nutrient loading and associated algal blooms. Siltation of the west branch of Redwood Creek is a potential significant adverse impact upon the ecosystem of the creek downstream of the project site. This siltation could affect the sensitive native steelhead rainbow trout population.

Sensitive Species. The project has the potential to have significant short-term and long-term impacts on the native population of steelhead rainbow trout (Onchorhynchus mykiss) that use the west branch of Redwood Creek for spawning habitat. In the short-term, the construction of the project could lead to siltation of the creek, and the smothering of sensitive spawning gravels with mud. Siltation of the stream would reduce local trout populations in the short-term. Population reduction could range from moderate to severe, depending on the time of year grading and construction occur. If significant erosion were to occur between January and April, for instance, the creek could be harmed for a year or more due to the elimination of spawning habitat and/or the smothering of eggs by sedimentation. Moreover, oil, grease, and lime from construction activities could adversely affect water quality.

Long-term impacts to the steelhead rainbow trout population of the west branch of Redwood Creek due to the project could also be significant. Runoff from the site attributable to the project will drain directly into the creek and will include urban pollutants such as oil, grease, soap suds, antifreeze, rubber particulates, fertilizers, herbicides, and pesticides, all of which would adversely affect water quality in the creek. Over time, urban pollutants attributable to the project could combine to have a long-term impact on the trout population of the stream, and could reduce its viability as a native steelhead trout fishery.

City of Oakland General Plan. The proposed project is consistent with the City of Oakland General Plan goal of preserving wooded tracts of open land. Wooded tracts on much of the east side of the site, although proposed as part of privately owned lots, are not planned for development.

With respect to the General Plan policy of avoiding the removal of desirable species of trees, most building footprints appear to have been designed to

minimize tree removal with the exception of lot #19 and lot #21. Redesign or reorientation of these two footprints and/or lot lines could substantially reduce tree loss, and would then be consistent with the stated General Plan policy.

The proposed plan takes care to preserve existing vegetation as much as possible and not to destroy wildlife habitat unduly, and therefore appears to be consistent with the General Plan policy of perpetuating the full range of plant types and communities and wildlife variety which may exist on the site.

No evidence of rare or endangered species has been found on the site. Therefore, the proposed plan appears to be consistent with the General Plan policy of giving protection to rare or endangered species.

The proposed plan retains examples of native vegetation, leaves large sections undisturbed, and will provide suitable new plant materials to provide food and shelter for wildlife. Therefore, the plan appears to be consistent with the General Plan policy urging native vegetation retention, the leaving of undisturbed areas, and the provision of new vegetation for wildlife.

The project site is heavily wooded, and most trees will be retained. Therefore, the plan appears to be consistent with the policy of tree planting where needed. In this case, it should not be needed.

The applicant has indicated that he intends to landscape with native plant species wherever practicable. Therefore, the plan appears to be consistent with the General Plan policy calling for the use of native plant species in landscaping, wherever practicable.

The plan provides no basis for assuming that there may be an indiscriminate use of pesticides and herbicides. Further, this EIR recommends a mitigation measure to minimize the use of pesticides and other potentially harmful pollutants. Therefore, with this mitigation measure, the plan appears to be consistent with the General Plan policy to avoid the indiscriminate use of dangerous herbicides and pesticides.

MITIGATION MEASURES

In order to offset or avert biological impacts on the proposed project site, the following mitigation measures are recommended. Unless otherwise noted, implementation of the following mitigation measures will reduce identified significant adverse impacts to less-than-significant levels.

Vegetation and Wildlife

- The applicant has submitted an application for a tree removal permit for trees designated for removal due to road construction. City regulations will require replacement plantings on site or a combination of replacement plantings and in lieu of fees for the 232 native trees proposed for removal, if removal permits are granted (proposed). The loss of these mature protected trees will, however, remain as a significant unavoidable impact of this project.

- A verified survey of trees designated for removal due to the construction of residences will be required to be submitted at a later stage in the planning process and will be subject to permit review.

- Lot lines and building footprints within the lots shall be designed to avoid the removal of existing mature native trees wherever possible. Building footprints for lot 28 should be moved to preserve one-half of the projected loss of trees on that site. If this is not possible it is recommended that lot 28 be left as open space. Also Lots 1, 2, and 41 should be left as open space to preserve an important oak grove, and Village Loop Road going toward Swing Place should not be constructed so that 3 important individual oaks can be saved. This remains a significant unavoidable impact of this project, however, unless density is reduced as indicated in the reduced scale alternative.

- The machinery, earthen, or stockpiled materials produced or used during the construction of water systems, storm drainage, buildings, and roadways shall be kept away from the driplines of trees, vegetated areas, and drainage areas.

- Vegetation removed as a result of project activities shall be replaced with native or naturalized species that are of value to local wildlife, and native vegetation shall be retained wherever possible. Native plants are generally more valuable as wildlife food sources and require less irrigation, fertilizers, pesticides, and herbicides than introduced species.

- A detailed landscaping plan will be required to be submitted to the city for approval. Homeowners shall be encouraged to landscape with native drought tolerant vegetation. Existing native vegetation in the eastern portion of the lots should not be removed unless part of an approved fire safety program. These requirements should be considered for inclusion in the covenants, codes, and restrictions (CC&R) of the project's Homeowners Association.

- Construction activities shall be as limited in areal extent as is feasible to minimize wildlife habitat disturbance. Temporary fences shall be erected between construction sites and designated open space natural areas to protect the vegetation from being trampled by human traffic and equipment access and storage.

- Fencing of lot lines should not be permitted, so as not to disrupt wildlife movement.

- Residents should be prohibited from allowing household cats to roam at night, and all cats should be required to wear bells. These prohibitions should be stated in the project's CC&Rs.

Sensitive Species

Due to site-specific factors such as soils with very severe erosion hazard and increased human activity within the Redwood Creek watershed, both short-term and long-term impacts to the native steelhead rainbow trout populations could occur. The following mitigation measures are recommended to minimize the

environmental impact on this special fish population by minimizing impacts to the water quality of Redwood Creek:

- Grading and construction activities shall be prohibited on the site between October and May.

- An erosion control plan shall be designed pursuant to guidelines of the Association of Bay Area Governments. This erosion control plan should be reviewed by East Bay Regional Park's Fisheries Department in addition to the Public Works Department and should also meet with the approval of the CDFG. See Section 4.5, "Hydrology, Storm Drainage and Water Quality" for specific erosion control measures that should be in the erosion control plan.

- Grease traps and sediment catchment basins shall be installed to capture runoff from impervious areas such as parking lots and roadways, minimizing pollutants entering Redwood Creek.

- A terraced cascade of vegetated retention ponds or other treatment technology to filter pollutants from stormwater should be incorporated into the project's storm water system design at point of concentration number 1 (P.O.C. #1) in order to minimize stream siltation. The ponds would allow site runoff to percolate into the soil, and most metals and other organic constituents would be taken up by the vegetation. The retention ponds should be designed to retain the amount of runoff expected from a 10-year storm event. The Department of Fish and Game, the Regional Water Quality Control Board (Region 2), and the City of Oakland should approve the design of the ponds or other technology and the plan for ongoing maintenance. A provision for responsibility for implementation of the maintenance plan should be included in the CC&Rs for the project. Also, to reduce the buildup of numerous contaminants on paved surfaces, a program of regularly sweeping driveways and streets shall be included in the CC&Rs. Cleaning of streets and driveways by power flushing would be specifically prohibited.

- All mitigation measures in Section 4.5, "Hydrology, Storm Drainage, and Water Quality" regarding preservation of water quality and reducing erosion shall be implemented.

4.7 UTILITIES AND PUBLIC SERVICES

EXISTING SETTING

Fire Protection. Fire protection for the project site is to be provided by the City of Oakland Fire Department. The first station that would respond to an emergency at the site is station Number 21, located at 13150 Skyline Boulevard. Emergency response time from this station is approximately five minutes, calculated as the time to receive the alarm, dispatch, and travel from the station to the project site. Station 21 is manned by four personnel (an officer, an engineer, and two fire fighters) and is equipped with an engine carrying 500 gallons of water and a brush wagon (a four-wheel drive vehicle) carrying 300 gallons of water.

Police Services. The City of Oakland Police Department serves the project site area. The city operates out of one police station located at 455 Seventh Street. There are currently 669 sworn officers on the force. The city utilizes a beat system, and four patrol areas cover the Oakland hills area. Response times to the project area vary depending on the type of call. Emergency calls can be dispatched in less than one minute, while lower priority calls may take up to 45 minutes (Bellman, 1992).

Emergency Services. Alameda County Department of Emergency Medical Services has a contract with Regional Ambulance for the provision of emergency medical services. Regional provides emergency medical service that responds to 911 emergency medical calls. Regional's ambulances are equipped with two paramedics, and operate on a beat system. Ambulances are stationed throughout the city in order to provide quick response to emergency medical needs. Peak time staffing provides approximately 20 to 35 ambulances at any given time to cover the Alameda County area (Osur, 1992).

Natural Gas and Electricity. Natural gas and electricity are provided to the project area by the East Bay Division of the Pacific Gas and Electric Company (PG&E). PG&E's electricity is generated by hydroelectric, thermal, geothermal, wind, turbine, solar, nuclear, and fossil fuel facilities (Sloan, 1991). Their natural gas is supplied from U.S. sources in Texas and Montana and also from Canada and Mexico. Electricity to the project site would be provided via one of three PG&E substations - J, EDES, or X - located at 51st and Coliseum, Edes Avenue, and Park Boulevard and Interstate 580 respectively.

Solid Waste Disposal. Solid waste collection and disposal services to the project site are provided by the Oakland Scavenger Company (OSC), 7677 Oakport Street, Suite 350, Oakland. Nonhazardous solid waste is hauled to OSC's transfer station at 2615 Davis Street, San Leandro, and is transferred to the Altamont Landfill, 10840 Altamont Pass Road, Livermore, in Alameda County. The City of Oakland does not have a curbside recycling program for residential land uses.

The Altamont landfill covers approximately 1,700 acres and is now about 10 years old. Its capacity is estimated to be about 60 years. Its current permit is for the use of 210 acres for Class III garbage and Altamont Landfill officials estimate that the capacity of the 210 acres will be reached in about 10 more years (Daugherty, 1992). The landfill is currently applying for a

permit to open an additional 210 acres for Class III garbage. This landfill does not accept sludge from sewer systems or septic tanks.

Telephone Service. Telephone service is provided to the project site by Pacific Bell, 685 A Street, Hayward, California. Cabling to the project site is provided jointly with PG&E in underground trenches. The cable used is made of plastic, adding no toxic substance to the soil. Metering of telephone usage is done through a set of cable pairs that are connected to Pacific Bell's central office (Miller, 1992).

Wastewater Services. East Bay Municipal Utility District (EBMUD) provides wastewater interceptor and treatment services for the City of Oakland. The city owns the sewer lines and approves connections for services. What can occur when sanitary sewer pipes deteriorate is that storm water infiltrates the sanitary sewer pipe, exceeding its capacity, resulting in an overflow of water containing sewerage. These overflows normally occur at manholes, discharging onto the street and then into the storm drain system potentially polluting receiving waters. A 20 year Infiltration and Inflow (I & I) study and remedial program began in 1980, which consists of the identification and repair of 'problem' areas in the sewer mains and lines where overflow or inflow occurs during the wet season. Identified problem areas undergo maintenance and rehabilitation in order to reduce or eliminate pipe leaks that allow storm water to enter the sewer system and increase influent to the wastewater treatment plant (Kim, 1992).

The EBMUD wastewater treatment plant that would provide service to the project site is being expanded primarily to accommodate wet weather stormwater infiltration. There are no capacity problems due to wastewater aside from the issue of stormwater infiltration. The typical flow of influent currently ranges from 70 mgd to a high of 125 mgd (Kim, 1992). Current construction would increase its primary treatment capacity from 290 mgd (million gallons per day) to 415 mgd, although the design capacity of the plant for complete wastewater treatment will remain at 120 mgd. When influent rates exceed the capacity of the primary treatment plant (which sometimes occurs due to stormwater inflows during the wet season storms), the excess bypasses the treatment plant and flows untreated into San Francisco Bay. Responding to pressures from the Regional Water Quality Control Board and other regulatory agencies, the treatment plant is increasing its capacity to stop untreated water discharges to the Bay. A wet weather holding basin being constructed would handle additional increases in influent which occur during the wet season as a result of improper storm drain connections.

Water Services. EBMUD serves parts of Alameda and Contra Costa Counties, providing domestic water service to approximately 1.1 million customers. Although demand varies with rainfall and other factors, a 10 year average annual water use has been calculated at 216.8 mgd. According to a 10 year study, peak demand water usage was 279 mgd during one July month. In the area of the project site, the average daily water use per single-family residence is approximately 270 gallons (McGowan, 1992).

Public Schools. The proposed project site is located within the boundaries of the Castro Valley Unified School District. However, school aged children living in the vicinity of the project site attend Oakland City schools because of the distances to Castro Valley schools. Upon annexation to the City of Oakland, the project site would officially be served by the Oakland Unified

School District. Schools which would serve the school aged children of the proposed project are Burckhalter Elementary, Montera Junior High, and Skyline High Schools (Linde, 1992).

Parks and Recreation. The City of Oakland Department of Parks and Recreation strives to maintain a ratio of one acre of park for each 1,000 population. The nearest parks serving the project area include Pinto Recreation Area, which provides approximately 3.3 acres of park space and is located at Redwood Road and Campus Drive less than 0.5 miles from the project site; Leona Heights Park, located approximately 0.5 miles from the project area at Mountain Boulevard and Carson Street, provides an additional 10 acres of park space to the project site. Skyline High School located adjacent to the southern side of the project site provides additional park and recreation including baseball fields, soccer fields and playground space to the project site. However, according to the Department of Parks and Recreation, these parks are not located close enough to the project site to be considered within the neighborhood (Osur, 1992). These parks are also not located close enough to the project site to be considered a short and safe walking distance for children that would occupy the proposed project site as a main road would need to be crossed by park goers from the project site to nearby parks.

IMPACTS OF THE PROPOSED ACTION

Standard of Significance. The project will be identified as having a significant effect on the environment if it would interfere with emergency response plans or emergency evacuation plans; conflict with established recreational, educational, religious, or scientific uses of the area; substantially degrade or deplete ground water recharge; or extend a sewer trunk line with capacity to serve new development. Impacts to public facilities by this project may be identified if the project would induce substantial growth or concentration of population, since secondary effects of such growth or concentration could include an increased demand for school, police, fire, water and storm sewer services, and utilities.

Fire Protection. The proposed project would increase the demand for fire protection services. The location of the project site on the wildland/urban interface make this site within an area of extreme wildfire hazard. Improper project design would create significant problems for the Oakland Fire Department. Therefore, proper protection measures are required by the fire department and are included in this EIR as mitigation measures. Owing to the location of the proposed project in a heavily wooded area, it may be held to particularly stringent fire protection standards. Building and fire code requirements are currently being upgraded in the City of Oakland as a result of the catastrophic firestorm of October 1991. The proposed development will be subject to all building code requirements and additionally recommended fire protection requirements necessary, as determined by the City of Oakland Fire Department.

The applicant has acknowledged the importance of fire protection measures for the proposed project, owing to its location in an urban wildland interface. The 1975 gift of 19 acres of land on the east side of the project site by the previous land owners to the East Bay Regional Park District (EBRPD) was explicitly intended to help the EBRPD protect against fires on its parkland. The proposed project provides for the maintenance of existing fire trails

located along the northeasterly side of the property. The EBRPD would be allowed annual access across the project site to maintain its fuel breaks.

The proposed project includes provisions for a gated entrance in order to limit access. Such provisions prohibit access to the site for emergency vehicles. The City of Oakland does not currently have an approved gated access override system that would allow emergency access to gated communities. Therefore, the proposed project including a gated entrance would prevent emergency access to the site and would therefore result in a significant adverse impact. This impact can be mitigated only by proposing an override system that would allow emergency vehicles access to the project site.

Police Services. The proposed project includes provisions for a gated access. Such provisions would prohibit access to the site by emergency vehicles, and would therefore result in a significant adverse impact. This impact can be mitigated by proposing an adequate gated access override system that would be approved by both the City of Oakland Police Department and the City of Oakland Fire Department (Wengeler, 1993). Although the project is not expected to create the need for additional police personnel, the Police Department has recommended the requirements of several mitigation measures to reduce the impact of the project on police services, which are included as mitigation measures in this Draft EIR (Muzar, 1992).

Emergency Services. The proposed project site is not expected to impact emergency services currently available to the City of Oakland (Osur, 1992).

The proposed project site is located in a 14 minute response zone for Regional Ambulance, which is less stringent than the average eight minute response zone. This longer response time allowance is due to the nearness of the Fire Station Number 21 on Skyline Boulevard, which will provide emergency service to the project site so that ambulance timeliness is less of an issue. Fire Department officials would most likely arrive first on scene and would provide emergency care until the ambulance arrives. Alameda County currently collects a paramedic benefit assessment with an annual base fee of $21, which can vary from city to city. The City of Oakland currently assesses $24.61, slightly higher than the county's base fee. The additional $3 can be used for additional equipment for the Fire Department or personnel training. Alameda County receives approximately one call per 1,000 population. The County currently has no target ratio of emergency personnel or ambulances per 1,000 population (Osur, 1992).

The proposed project includes provisions for a gated entrance providing restricted access to the project site. Such limited access would prohibit access to the site by emergency vehicles, resulting in a significant adverse impact. This impact can only be mitigated by providing the Alameda County Department of Emergency Medical Services and the Oakland Police and Fire Departments with a proposal for an override system that would allow undelayed access to the site for emergency vehicles.

Natural Gas and Electricity. The supply of natural gas and electricity to the project site will neither tax the supply capabilities nor affect delivery of services to other customers in the area. Therefore, the proposed project is not identified as having a significant impact on gas and electricity availability, nor cause impacts to existing PG&E customers.

Solid Waste Disposal. The project would not significantly increase the demand for solid waste disposal services. The Oakland Scavenger Company anticipates no problems in providing collection and disposal services to the proposed project (Fazio, 1992). The average amount of solid waste generated per single family residence is approximately 32 gallons per week. Based on this estimate, the proposed development of 42 single family homes would generate approximately 1,344 gallons of solid waste per week. The Altamont landfill has adequate capacity for solid wastes generated by the proposed project. Assembly Bill 939 requires a city or county to divert 25 percent of all solid waste from landfill or transformation facilities (recycling) by January 1, 1995, through source reduction, recycling, and composting activities. This diversion must increase to 50 percent by January 1, 2000. In order to preserve remaining disposal capacity and meet AB 939 requirements, efforts should be made to minimize project generated solid wastes destined for landfills by maximizing recycling and waste reduction efforts. The direct solid waste impacts of this project are identified as less-than-significant.

Telephone Service. No significant impacts to telephone services are anticipated by Pacific Bell as a result of providing service to the proposed project. The Pacific Bell Telephone Company would provide services to the subject site without adverse impacts to its other customers.

Wastewater Services. The amount of sewage that would be generated as a result of the proposed project, estimated to be 100 percent of projected water use, or 11,340 gallons per day, will not significantly impact wastewater services currently provided to the City of Oakland by EBMUD. The increase in influent capacity to 415 mgd is adequate to handle any increase in wastewater generated by the proposed project.

Sewer lines owned by the City of Oakland located in the vicinity of the project site on Balmoral Drive consist of eight inch lines and should be adequate to handle the increase in waste water generated by the proposed development (Byers, 1992). Figure 4.7-1 shows the proposed site sewers and fire hydrants in relation to the City of Oakland's sewer system. This is not identified as a significant impact.

Water Services. Water for the proposed project site would be supplied by EBMUD's Madrone Reservoir. Water is provided to the project site by EBMUD via lines owned and maintained by EBMUD. Water mains located on Blythen Way would be extended through the project site and to individual homes at the expense of the applicant.

Based on the estimated water use of 270 gpd per single-family residential unit in the project area, the proposed project will generate a demand of 11,340 gallons of water per day, or 4.1 million gallons per year. The project itself will not create a significant impact on the current water supply available to the City of Oakland, but will contribute to a cumulative impact on water demand. EBMUD currently strongly recommends that water conservation features be incorporated into the design of houses and landscaping to reduce this

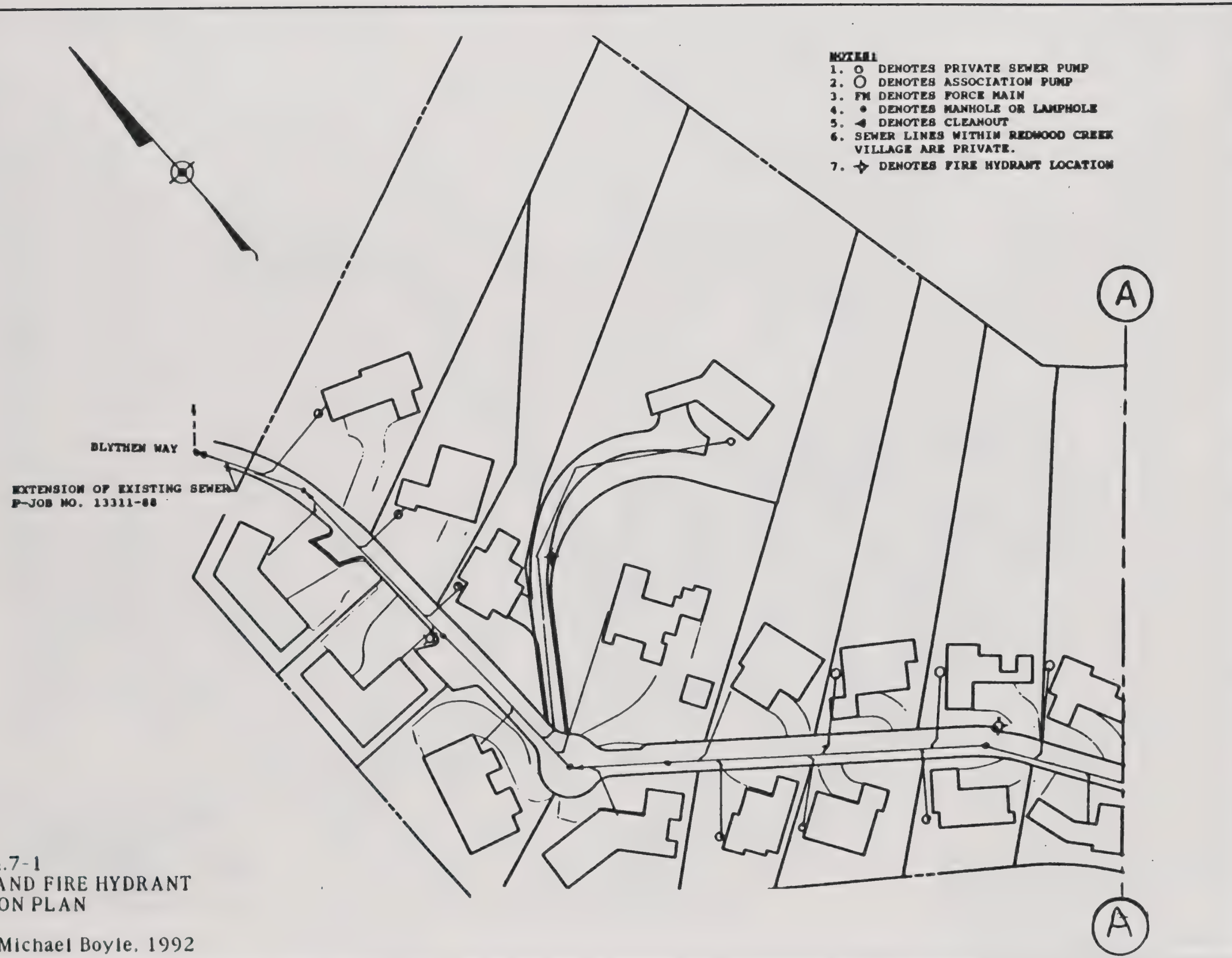


Figure 4.7-1
SEWER AND FIRE HYDRANT
LOCATION PLAN

Source: Michael Boyle, 1992

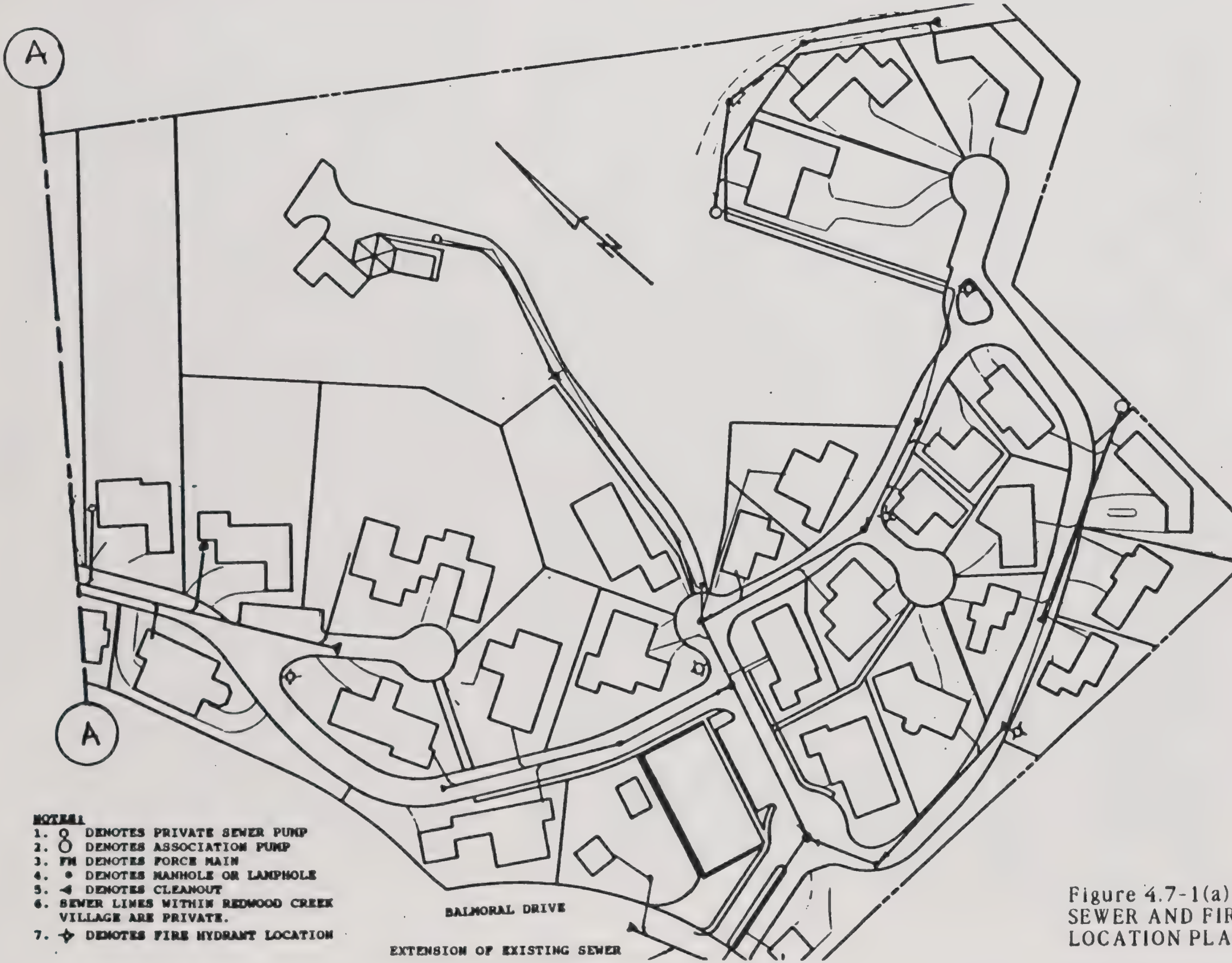


Figure 4.7-1(a)
SEWER AND FIRE HYDRANT
LOCATION PLAN

Source: Michael Boyle. 1992

impact. The District also restricts water use for lawn irrigation. New turf lawns are not allowed, and drip irrigation systems are required for all landscaped areas (McGowan, 1992).

Public Schools. The proposed residential development will generate a demand for educational services. The Oakland Unified School District has available capacity within the system to accommodate the new students. Burckhalter Elementary School has an enrollment of 294 students and a capacity of 309 students. Montera Junior High School has an enrollment of 875 students and a capacity of 1,138. Skyline High School has an enrollment of 1,838 and a capacity of 2,098 (Linde, 1992).

Using California Department of Education students/residence generation factor of .7 students per household, based on 45 units, the proposed project would generate approximately 30 students. These students could be accommodated at area schools. Burckhalter Elementary School currently has an available capacity of 15 students, Montera Junior High School 263 students, and Skyline High School 260 students. Adequate capacity is available within the Oakland Unified School District to accommodate students generated from the proposed development. Therefore, this is not identified as a significant impact.

However, the proposed project may result in cumulative impacts on schools when considered with other new developments proposed for the City of Oakland. Projects currently proposed to be located in the project area in the City of Oakland include Oakcrest, Oak Knoll Vista, Montebello Terrace, and Merritt College. Cumulatively these projects would increase demand for school services by increasing the number of school and children in the area. The number of students attending nearby schools would increase by approximately 147 students (based on approximately 210 proposed residential developments). Capacity is generally available in the school district as a whole but some students may need to be transported to schools that can accommodate them if nearby schools exceed capacity (namely, Burckhalter Elementary School which is near capacity). Both the Montera Junior High School and Skyline High School should have adequate capacity available for cumulative project proposed.

Parks and Recreation. The City of Oakland currently meets its goals for park and recreation as it has approximately 2,000 or more acres of park and open space for a population of approximately 374,000. However, although their inventory meets the current goals, the distribution of parks is inadequate. For example, in areas where the concentration of children is high, there are too few playgrounds and parks; where few children are located, there is an abundance of playgrounds and park space provisions. The proposed project consisting of 42 single family residential homes would increase the demand for park and recreation services. The lack of a local neighborhood park within walking distance of the project site would not be likely to provide school age children sufficient areas for outdoor play. It is strongly recommended by the City of Oakland Department of Parks and Recreation that the proposed project provide approximately 5,000 to 10,000 square feet of park and recreation space that includes some playground amenities for children generated by the proposed project (Acosta, 1992). Appropriate placing of the park on public space would dictate that it be located between lots 21 and 44, on the southeastern portion of the project site near the redwood forest. Area for a small park has been annotated in this area on the preliminary site plan; however, the space

allotted for the park should increase to at least 5,000 square feet (current plans indicate that the park is approximately 2,500 square feet). Pedestrian access and parking should also be provided.

MITIGATION MEASURES

The following mitigation measures related to public service impacts will reduce identified significant and potentially significant impacts to less-than-significant levels, unless otherwise indicated.

Fire Protection. To reduce significant impacts on fire protection services:

- The gated feature of the plan should be eliminated or a system of emergency access devised which has the approval of fire, police, and ambulance agencies.

- The project will be covered by the newly-adopted requirements in the Oakland Building Code for special code provisions of the "Hazardous Fire Zone." This project will be located in the hazardous fire zone and buildings must comply with fire-resistive construction requirements, such as the prohibition of eave vents, Class A roofs, special siding protection, etc.

- Hydrants must be within 500 feet of the farthest part of the building, as the hose is laid. Fire flows required for the proposed development are 1500 gallons per minute (gpm) at 20 pounds per square inch (psi). Fire flows of 1,000 gpm would be acceptable if all structures are equipped with sprinklers to at least Oakland Level II.

- Hydrants on dead-end streets must be no more than 150 feet from the dead-end (Collins, 1992).

- All project roadways shall conform to city standards (see Section 4.3, "Traffic, Parking, and Circulation").

- Class "A" roofs are required because the project site is in a potentially critical fire area. Roofs rated Class A include clay tiles, concrete tiles, fiberglass shingles, metal tiles, and perlite shakes.

- If sprinklers are not installed, structures three or more stories high shall have a secondary exit that leads to the street, and a secondary access to the third story.

- Structures, if any, that are four stories high must be equipped with fire control sprinklers.

- A fuels management safety zone shall be cleared from each home for a distance of not less than 30 feet. No limbs or overhanging branches should be near any structures.

- The homes shall have interconnected (hard wired) smoke detectors, meaning that if a smoke detector goes off due to smoke in one room, all

smoke alarms will be triggered to go off in order to alert residents in all areas of the home.

- Stucco exterior or one-hour rating construction on exterior walls of residences to minimize fire hazard.

- Screens over outlets of every chimney or stovepipe that is attached to any fireplace, stove, or other device that burns any solid or liquid fuel shall be provided and maintained at all times. Screens should be constructed of nonflammable material with openings of not more than one-half inch in size.

- Addresses easily read from the street shall be posted on each residence.

- Project landscaping shall consist predominantly of native, drought tolerant, and fire resistive plants.

In order to ensure access to the site for emergency vehicles, the developer shall do one of the following:

- Alter the proposed project to allow for an open entrance, not a gated entrance.

- Submit a proposal for a gated access override system to the Fire Chief and the Chief of Police for approval. The gated feature of the project will require specific city review and approval.

Fire and Building Codes are being strengthened due to the Oakland Hills fire in October of 1991. The proposed development shall conform to Fire and Building Codes in effect when building permits are issued unless a development agreement is reached which stipulates otherwise.

Police Protection

- All residences should display a clearly visible address, no less than six inches in height.

- All exterior doors and doors leading to the interior from the garage should be one and three-fourths inch thick solid core in construction.

- All exterior doors should be equipped with the following:

    * One inch deadbolt locks, twin cylinder with key retaining feature on main entry door.

    * 190 degree optical viewer, front door only.

    * Maximum security strike plates on all deadbolt locks.

    * Non-removable hinge pins on all exterior doors.

- The developer should submit site plans, hardware specifications, and a construction crime prevention plan to the Chief of Police for approval.

- In order to mitigate impacts to emergency police and fire services and emergency services to the site, the developer shall do one of the following:

  * Alter the proposed project by providing open access to the site.

  * Submit a proposal for an access override system to the Chief of Police, the Fire Chief, and the Alameda County Department of Emergency Services for approval.

- Mitigation measures stated under "Police Services" and "Fire Services" regarding access to the site by emergency vehicles shall be adhered to in order to mitigate impacts to emergency services.

Solid Waste Disposal. To maximize recycling, reduce waste, and promote the consumption of recycled materials:

- A curbside recycling program or an on-site recycling center shall be incorporated into the project. Submit plan to City of Oakland for their review and approval. The Homeowners Association should maintain the program on an ongoing basis.

- Information shall be provided by the Homeowners Association to residents about the recycling services, buy back centers, and possible markets for recyclables in the area. Homeowners should be encouraged to recycle glass, metal, cardboard, and other materials to the maximum extent feasible.

- Insulation and other products made of recycled materials may be used in the construction of development structures.

- Develop and implement a program to recycle construction debris.

Wastewater Services

- The project engineer should submit the plans for on site sewer lines to the City of Oakland, Office of Planning and Building, Development Services, for approval.

Water Services

- Water conservation devices such as low flow shower heads and toilets shall be incorporated into the design of the proposed residential development in order to mitigate cumulative impacts.

- Landscaping shall consist of native and drought tolerant vegetation which require less water. Turf lawns shall not be planted for the proposed project. Landscaping shall be drip irrigated.

Parks and Recreation

- The proposed project shall include the dedication of approximately 5,000 to 10,000 square feet of open space area to be improved with playground facilities, such as swings and slides, in order to provide nearby recreation facilities for children of project site homes. The exact size of land to be dedicated shall be determined through coordination with the City of Oakland Office of Parks and Recreation (OPR). This dedication would not be an addition to the city's current parks and open space system, but would provide for adequate recreational space to future residents of the proposed project. Pedestrian access should be provided, most likely between lots 21 and 44.

4.8 NOISE

EXISTING SETTING

Noise Sources. The primary noise source affecting the site and site vicinity is motor vehicle traffic on Balmoral Drive, Skyline Boulevard, and Redwood Road. Occasional noise also occurs from malfunctioning automobile alarms on the Skyline High School parking lot.

Sensitive Receptors. Sensitive receptors are those persons and facilities which could be adversely affected by noise. Sensitive receptors in the project area include the existing Hillcrest Court and Hillcrest Highlands residential developments and the Skyline High School.

Noise Standards. The Noise Element of the City of Oakland General Plan (see Figure 4.8-1) identifies a sound level of up to 65 Community Noise Equivalent Level (CNEL) as "normally acceptable" for residential land use.

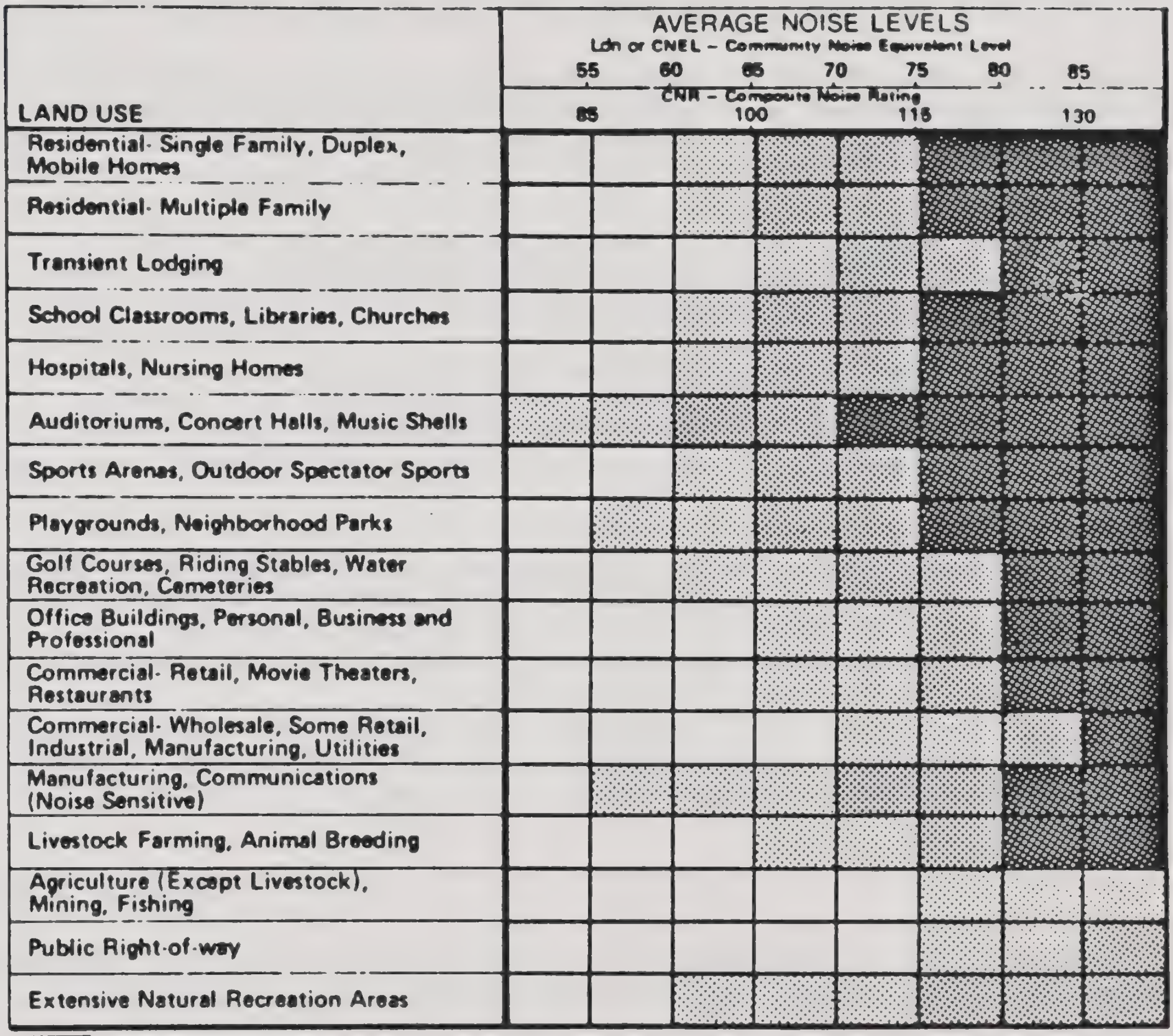
Existing Noise Levels. The existing noise levels at and adjacent to the site have been estimated, based on the reported traffic volumes, to be approximately 63 CNEL at a reference distance of 50 feet from the center line of Balmoral Drive. The estimated sound level at this reference location is in the "Normally Acceptable" range, although above the "Clearly Acceptable" range, as identified in the City of Oakland Noise Element (based on U.S. HUD guidelines). One building, that is the planned dwelling on lot 10, will be at this approximate location; other dwellings will be significantly farther from the roadway.

IMPACTS

The project will be identified as having a significant noise impact if it will cause a change with respect to current allowable maximum sound levels or anticipated (cumulative) levels of noise. If the project is not in conformance with the maximum allowable dBA levels of the Noise Element of the General Plan, or if it would cause a sound level increase of three dBA or more at neighboring properties, with the resulting level being greater than the applicable standard, the impact will be identified as being significant.

Construction Noise. Initial noise impacts of the proposed residential development would result from construction activity, including truck deliveries and on-site construction activity.

Construction noise, which includes noise from the operation of paving machines, trucks, and other equipment, would increase ambient noise levels in the construction vicinity. Major sources of construction noise and the typical A weighted sound level which is perceived by the human ear at 50 feet are: dump truck (88), portable air compressor (81), concrete mixer (85), piledriver (101), jackhammer (88), bulldozer (87), paver (89), pneumatic tools (85), backhoes (85) (EPA, 1971).



CLEARLY ACCEPTABLE
The noise exposure is such that the activities associated with the land use may be carried out with essentially no interference from aircraft noise. (Residential areas: both indoor and outdoor noise environments are pleasant.)

NORMALLY ACCEPTABLE
The noise exposure is great enough to be of some concern, but common building construction will make the indoor environment acceptable, even for sleeping quarters.

NORMALLY UNACCEPTABLE
The noise exposure is significantly more severe so that unusual and costly building construction is necessary to insure adequate performance of activities. (Residential areas: barriers must be erected between the site and prominent noise sources to make the outdoor environment tolerable.)

CLEARLY UNACCEPTABLE
The noise exposure is so severe that construction costs to make the indoor environment acceptable for performance of activities would be prohibitive. (Residential areas: the outdoor environment would be intolerable for normal residential use.)

SOURCE: U.S. Department of Housing and Urban Development, Aircraft Noise Impact; Planning Guidelines for Local Agencies, by Wilsey & Ham and Bolt, Beranek and Newman, 1972.

earth metrics

SCALE

FIGURE 4.8-1 H.U.D ACCEPTABILITY RANGES OF EXTERIOR NOISE LEVEL BY LAND USE CATEGORY

Noise levels will decrease with distance and be attenuated by obstructions such as buildings or walls. Construction noise will be temporary, but without mitigation it would be identified as significant.

Vehicle Traffic Noise Impact on the Neighborhood. The proposed development is expected to generate additional vehicular traffic on lower Balmoral Drive and on other local roadways. However, the magnitude of the associated sound level increases will not be significant.

The sound levels that will be created by the vehicular traffic, after project construction, were calculated based on the projected traffic volumes and distribution patterns, in accordance with procedures of the Federal Highway Administration (1978). The calculated future sound levels indicate that noise levels in the vicinity of the site due to traffic sources on Balmoral Drive, Skyline Boulevard, and Redwood Road will be increased by less that one dBA under both post project construction and cumulative traffic conditions. This level of noise increase is not generally noticeable and is not identified as significant.

Vehicle Traffic Noise Impact at the Project. Since the project-generated and cumulative increases in traffic noise affecting the site will be insignificant, the sound level at the planned dwellings will remain within the "Normally Acceptable" range of the City of Oakland Noise Element.

Other Noise Impacts. Some additional noise will occur at the site as a result of automobile alarm malfunctions at the Skyline High School parking lot. Also, some noise will occur due to automobile traffic in the school parking lot.

MITIGATION MEASURES

Construction Noise. The following mitigation measures are recommended to reduce the temporary adverse impacts associated with construction activities and are considered standard and routine.

- All construction vehicles and equipment should be properly muffled. California Noise Standards for Delivery Motor Vehicles should be met.
- Construction operations and related travel in the vicinity of the project site to and from the construction area should be limited to the hours between 7:30 A.M. to 6:00 P.M., Monday through Saturday.
- The public should be informed of proposed construction timelines to minimize potential annoyance related to construction noise. This is important for residences located within a few hundred feet of construction activity.
- Temporary barriers, including wood stockpiles, should be used where feasible to shield the construction equipment and vehicles from sensitive receptors.

- Where feasible, construction should be begin at the portion of the site nearest the sensitive receptor, so that these proposed buildings will provide a noise shielding benefit for later construction activities.

Other Noise Impacts. For best acoustical compatibility between the project and the adjacent Skyline High School parking lot, the following is recommended:

- A six foot high airtight barrier (wall or fence) should be installed along the site/school boundary above the finish grade at the barrier or a barrier of sufficient height to break the line of sight from vehicles in the parking lot to the first floor elevation at nearby residences of the planned project.

5. ALTERNATIVES TO THE PROPOSED ACTION

An analysis of reasonable alternatives to the proposed project is presented in this section, including general evaluations which compare the alternatives with the proposed project. The likely environmental effects of the alternatives which are described below are briefly discussed. As per CEQA requirements, when the No Project Alternative has the fewest environmental impacts, another alternative must be designated the environmentally superior alternative. The Reduced Magnitude and Alternative Design Project Alternative which describes a project with all mitigations recommended in this document plus design changes is identified as the environmentally superior alternative because it is found to have fewer environmental impacts than the Mitigated Project Alternative and the Alternative Sites.

5.1 NO PROJECT ALTERNATIVE

The No Project alternative assumes that the existing conditions will remain unchanged. The 30.19 acres would not be annexed to the city, including two existing residences on the Boyle site, the High School Parking Lot, the EBMUD Madrone Reservoir property, and the Markley property.

The proposed new housing units would not be built. The two existing homes would remain, and the two additional homes already approved by the county would likely be built. Existing city fire and police services to the site would continue. Tax revenues the city could expect form the project would not be generated. The No Project Alternative would not preclude the applicant from seeking to develop the site further within unincorporated Alameda County.

The identified significant impacts, which can be mitigated, would not occur. Visual impacts and changes which would result from project implementation would not occur. Identified biotic impacts which can be mitigated would be avoided, as would potential hydrologic, geologic, and public services impacts. The No Project Alternative would have the least environmental impact of all of the alternatives, and less than the proposed project.

5.2 REDUCED MAGNITUDE AND ALTERNATIVE DESIGN PROJECT ALTERNATIVE

This alternative is designed primarily to further reduce visual and tree loss impacts identified with the project as proposed and with the Mitigated Project Alternative. Visual and tree loss impacts are two of the four identified significant adverse impacts which are not mitigated to a less than significant level with the Mitigated Project Alternative. This Reduced Magnitude and Alternative Design Project Alternative would reduce visual and tree loss impacts to a less than significant level, and is identified as the environmentally superior alternative.

This alternative would eliminate that part of the south Village Loop Road which is shown to front on lots 16 and 18 (see Figure 3.3-1, p. 3.1-6). This change would save at least two, and possibly three, large oaks that otherwise would be lost to the roadway. South Village Loop Road would terminate in a cul-de-sac in the approximate location of the property line dividing lots 15 and 16 and would provide access to lots 15, 16, and 17.

The northern extent of Village Road from the circular feature in front of lots 3 and 4 would be maintained at its current dimensions and would provide emergency access only. Lot 45 will have driveway access directly off Blythen Way and, except in emergencies, will not have street access to the rest of the project. Lots 1, 2, and 41 would not be developed. Village Road along this segment would continue to be available as an emergency road for the existing Blythen Way homes to the north of the proposed project in the event Balmoral Drive should be temporarily blocked. The combination of these two actions would save an estimated 45 trees. In combination with the change to south Village Loop Road these changes would save an estimated 50 trees, or approximately 20 to 25 percent of the trees which would be lost with the project as proposed and with the Mitigated Project Alternative. This reduction is considered to be sufficient to result in an identification of less than significant impact to tree loss.

This alternative would also provide that homes built on lots 3, 4, 5, 6, and 8 would be limited in square footage to 90 percent of the average size house in the development and be limited to a roofline height of 15 feet above grade with rooflines generally following the slope contours. These changes would further reduce the visual impacts of homes on these lots which are identified in this EIR as being the most visually prominent from off-site vantage points.

5.3 ALTERNATIVE SITES

Two alternative sites are surveyed in this section. These will be referred to as the "Daly Ranch Site," as it consists of 26 acres of the Daly Ranch portion of a larger (1,146) site in Contra Costa County known as Gateway Valley. The other is a 5.8 acre site near to the project site, referred to as the "Mayer Site."

Daly Ranch Site Alternative. The Daly Ranch is a 508 acre parcel in Contra Costa County, and is part of a 1,146 acre development area within the Gateway Valley specific plan area of East Contra Costa (see Figure 5.3-1). In addition to Daly Ranch, the specific plan area consists of two other major land holdings, known as the East Bay Municipal Utilities District (EBMUD) and Zuckerman properties. The applicant has identified a 26 acre portion in the southern part of the Daly Ranch as a potential alternative site on which to construct 44 new homes.

The planning area of the City of Orinda includes Gateway Valley. It has been under consideration as a mixed-use development project including single family detached homes similar to those proposed in the Redwood Creek Village project.

The primary access to Gateway Valley is via Gateway Boulevard off of State Route 24, approximately one half mile east of the eastern portal of the Caldecott Tunnel. Traffic generated by the 44 units, combined with other traffic from the Gateway Valley area, would contribute to existing peak hour traffic congestion along SR 24 between the Caldecott Tunnel and the City of Orinda.

The extension of public utilities to this alternative site would be more costly than to the proposed project site, as they would have to be extended

No Scale

FIGURE 5.3-1
DALY RANCH ALTERNATIVE SITE

Source: Michael Boyle, Applicant, 1992

CERTIFIED/Earth Metrics

further. The extension of utilities would for this reason also generate more secondary impacts such as the potential for soil erosion. Like the project site, the Gateway Valley area is an area of relatively high wildlife values, and use of the site would entail some compromise of those values.

Soils on the rolling Daly Ranch site are relatively unstable, which could limit the density of home sites. Visual impacts from the development would be potentially significant and unavoidable. Views from both the east and the west, including residential areas along Moraga Way and Round Top Regional Park, would be affected. The visibility of the Gateway Valley development area from off-site vantage points is greater than that of the project site with its mostly "over the hilltop" setting and extensive vegetative screening.

In addition to the perceived disadvantages of this alternative site compared with the project site, the project sponsor rejected this alternative because he does not own the alternative site.

Mayer Site Alternative. A nearby site whose zoning would allow approximately the same number of units as the proposed project site zoned at R-10 is the Mayer site. The site is 5.8 acres and zoned R-30, which would allow up to 51 units to be constructed.

The site is located on the east side of Redwood Road about 1,000 feet north of Skyline Boulevard. Currently owned by Leon Mayer and the subject of a residential development proposal, an EIR is in the process of being prepared by the city. Because it is adjacent to areas of the Regional Park, the park district has indicated some interest in its purchase.

The site is characterized by very erodible soils and is crossed by two intermittent drainage swales. The U.S. Fish and Wildlife service has indicated that at least one, and possibly both, would require a Streambed Alteration Agreement.

The site drains into Redwood Creek as does the proposed project site, but the Mayer property is much closer to the creek itself. This means that there is much less intervening soil and vegetation which could filter out any contaminants then from the proposed project site.

The site is more visible to surrounding residential areas than the proposed project site since it is in the canyon below existing development. Thus, from a visual perspective, as well as from a water quality perspective, the Mayer site is identified as having more adverse impacts than the proposed project site.

5.4 MITIGATED PROJECT ALTERNATIVE

The Mitigated Project Alternative is the project with all of the recommended mitigation measures in this EIR. This is identified as the environmentally superior alternative.

6. ASSESSMENT CONCLUSIONS

6.1 SIGNIFICANT ENVIRONMENTAL IMPACTS WHICH CANNOT BE AVOIDED IF THE PROJECT IS IMPLEMENTED

Section 3 of this Environmental Impact Report (EIR) identifies potentially significant environmental effects of the proposed project. The following are significant environmental impacts which cannot be avoided if the project is implemented:

- Permanent loss of open space.

- Visual impacts to surrounding residences.

- Impacts to Redwood Creek and sensitive aquatic species.

- Loss of 232 trees, including a stand of oak and three prime oak specimens.

6.2 GROWTH-INDUCING IMPACTS OF THE PROPOSED PROJECT

A project is considered to be growth-inducing if it fosters significant economic or population growth, removes obstacles to growth, or stimulates the construction of new housing. A project which stimulates measured and deliberate growth may cause fewer adverse environmental impacts than one which promotes rapid or unregulated growth.

The extension of urban services into a previously unserved area or the establishment of major new employment opportunities are typically considered to be growth-inducing. If the proposed project would set a precedent, e.g., by obtaining a zoning variance to build more densely than current zoning would allow, or would build on wetlands which might open the door to further wetland construction, the project might also be viewed as growth inducing. Population and economic growth may tax a community's service facilities and infrastructure.

Development on this site would increase the resident population of the hills by introducing on-site population, but is not considered growth-inducing to any off-site areas. The future on-site population is not expected to generate the need for new schools, commercial, or other ancillary development. The existing roadway system and utility lines in the area are well defined. Any other future residential development in the area would generally be confined to in-fill type development, which is within the capabilities of the existing roads and infrastructure capacity.

6.3 CUMULATIVE IMPACTS

Cumulative impacts are impacts of this project which, when combined with impacts from other approved and reasonably anticipated future projects, may accumulate to a level of significance. The California Environmental Quality Act (CEQA) directs that cumulative impacts be discussed when they are

significant, and that the severity of the impacts and the likelihood of their occurrence shall be described. Discussion of cumulative impacts need not be as extensive as discussions of project impacts, but should be guided by standards of practicality and reasonableness. Ordinances or regulations which would affect a range of projects may be appropriate as mitigation measures for cumulative impacts rather than project specific mitigation measures.
CEQA Guidelines 15130.b.1.B allows for the cumulative impacts discussion of an EIR to be based on a summary of projections contained in a planning document which is designed to evaluate regional conditions. For purposes of this discussion, projections prepared by the Association of Bay Area Governments (ABAG) for the City of Oakland are used as a baseline to evaluate the cumulative impacts of the Redwood Village project on jobs/housing balance, traffic and circulation, and public services.

Discussions of the cumulative impacts on geology, drainage, vegetation and wildlife, and visual resources are based on local land-use plans which would allow residential development to continue to occur in the Oakland hills area. No attempt is made to quantify the future allowable development in this area; consequently, cumulative impacts are discussed in general terms.

For the purposes of this EIR, a list of reasonably foreseeable projects has been provided by the city and is used to identify cumulative impacts. The following projects are currently proposed or are under consideration and are included in the cumulative scenario:

Oakcrest	32 Units: 16 Townhouse Units, 16 Single-Family Detached Homes
Montebello Terrace	70 Single-Family Detached Units
Oak Knoll Vista	46 Single-Family Detached Units
Mayer Heights	23 Single-Family Detached Units
Leona Park Village	23 Units: 5 Single-Family Detached Homes, 18 Single-Family Attached (Duplex)

CUMULATIVE IMPACTS BASED ON ABAG PROJECTIONS

Oakland Projections. Table 6.3-1 "Oakland Household, Population, and Employment Projections" shows ABAG projections for the City for 1990 and 1995, the earliest time frame within which the project would be constructed and occupied. This table is utilized for identifying the potential impacts of future residential development in the discussions below.

Jobs/Housing Balance. The jobs/housing balance is a simple ratio between the number of jobs in a community and the number of employed residents that live in the community. A one-to-one relationship would imply that there is one job in a community for every employed resident. In reality, few communities maintain a balance of jobs and housing. Due to locational advantages, some communities tend to become employment centers, while others become residential centers. Even in a balanced community, workers often do not reside in the community where they work. Nevertheless, an adequate supply of jobs in a community gives residents and workers the opportunity to make that choice.

Based on Table 6.3-1, it can be interpolated that from 1990 through 1995, Oakland is expected to maintain a ratio of 1.17 jobs per employed resident.

This figure indicates an imbalance of jobs to housing in Oakland through 1995. From Table 6.3-1 it can also be interpolated that in 1990 the average household has 1.10 employed persons (calculation: employed residents/household population x persons per household = employed persons per household). In 1995 this average is expected to increase to 1.16. These figures suggest that a 45-unit development would provide local housing for about 50 employed persons.

The project would contribute to the cumulative number of housing starts during the 1990-1995 time frame. From a jobs/housing balance viewpoint, new housing opportunities of 1990-1995 have a mitigating effect by helping to offset the existing and projected jobs/housing imbalance in Oakland.

Traffic and Circulation. Future growth in Oakland will increase traffic volumes in the Oakland circulation system. Assuming a 7.5 daily trip rate per residence and assuming 2,190 new households during the period 1990-1995 (as per Table 6.3-1), Oakland's cumulative daily trip generation from residential development would result in an estimated 16,425 vehicle trips per day.

Public Services

Water. Assuming an average water usage of 87.5 gallons of water per person per day and 2,190 new persons as a result of new households from 1990-1995, cumulative water consumption would increase by an estimated 245,000 gallons per day.

Sewer Services. Assuming an average sewage generation of 65 gallons per day and 2,190 new persons, cumulative sewage consumption would increase by an estimated 182,000 gallons per day.

Schools. The Oakland School District does not use student generation factors. Utilizing information in Table 6.3-1, for purposes of cumulative impacts, a .92 student generation factor is used (calculation: 2.33 persons per household - 1.1 employed persons x .75 = .92). Accordingly, new households would increase the student population in the Oakland School District by an estimated 2,015.

CUMULATIVE IMPACTS BASED ON LOCAL PLANS

Introduction. The Oakland hills area is partially developed, with some fully developed areas separated by existing open space. The Oakland General Plan allows for additional development to occur in hillside areas. Future development as allowed by the plan would result in impacts similar to those described in this EIR for the Redwood Village project. In the discussions below, no attempt is made to quantify the future allowable development in this area; consequently, cumulative impacts are discussed in general terms.

Geology. Future development in the hillside area could increase erosion potential, resulting in increased sedimentation of downstream areas. Mitigation measures similar to those recommended for this project would help to reduce cumulative impacts of future development.

Hydrology and Drainage. The accumulation of runoff from future hillside development would add to urban pollutants which eventually would find their way to Redwood Creek. Any future, measurable rise in Redwood Creek pollutant levels would be considered significant.

Vegetation and Wildlife. Cumulative loss of vegetation due to future hillside development would diminish the amount of suitable habitat for the wildlife in the Oakland hills. This could result in a cumulative significant impact unless appropriate, coordinated mitigation measures are developed and approved which would allow for the continued free movement of the wildlife inhabiting the Oakland hills area.

Visual Resources. Existing development in the Oakland hills is scattered and is visually buffered by expanses of existing open space. The project would diminish the amount of existing open space and the visual relief it provides to the site locations below. As additional in-fill development occurs in the Oakland hills, the cumulative visual quality of the Oakland hills to various site locations below will change to a more urban quality with the cumulative reduction of open space.

6.4 RELATIONSHIP BETWEEN LOCAL SHORT-TERM USE OF THE ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

The relationship between local short-term use of the environment and the maintenance and enhancement of long-term productivity is often one of tradeoffs for balancing social, economic, and environmental impacts over time. In some cases, a relatively short-term benefit may have adverse cumulative effects, with the possibility that the future economy and society may be burdened with unreasonable project induced social and environmental costs. The opposite situation, in which long-term benefits occur at the expense of short-term dislocations, also is possible. Decisions that influence the balancing of such impacts for this project are the responsibility of the City of Oakland as part of its policy making and regulatory function. The project would irrevocably commit the site to residential land use.

6.5 IRREVERSIBLE ENVIRONMENTAL CHANGES AND IRRETRIEVABLE COMMITMENT OF RESOURCES

The commitments of land, materials and energy for the project are essentially irretrievable. Once converted to urban use, the land use change may be characterized as irreversible.

6.6 EFFECTS FOUND NOT TO BE SIGNIFICANT

In the Initial Study (Appendix A) prepared by the City of Oakland, some environmental issues were found not likely to be significant and therefore were determined not to require analysis. Based upon the Initial Study prepared by the City of Oakland, the following environmental impact issues are identified as not relevant for this project:

- Air quality;

- Risk of explosion or the release of hazardous substances;

- Relocation of residents or businesses;
- Destruction or defacement of a site of historic, architectural, archaeological or aesthetic significance; or
- Involvement of an increase of 100 or more feet in the height of any structure over any previously existing adjacent structure.

7. REPORT AUTHORS

This report was prepared by CERTIFIED/Earth Metrics of Brisbane, California. The following staff members of CERTIFIED/Earth Metrics participated in this project:

John Torrey, M. Arch, AICP, Reviewer
Fred Moseley, Ph.D., Project Manager
Naomi Sims, Ph.D., Biology
Ballard W. George, M.A., Noise
Elizabeth Bergen, B.Sc., Visual/Aesthetics
Patti E. Caswell, B.S., Public Services
Clark Pauley, B.A., Geology, Hydrology
Sheryl Schroth, M.A., Publications Manager
Caesar Jhanapin, Graphics

The following subconsultants to the applicant participated in this project:

John Forristal, Traffic and Parking
Globe Soil Engineers, Geotechnical and Soils Studies
Lynn Bowers and Associates, Incorporated, Hydraulic Study
Labadie Associates, Horticultural Consultants

8. ORGANIZATIONS AND PERSONS CONTACTED

Acosta, Antonio, Park Services Manager, Tree Division, Office of Parks and Recreation, City of Oakland, letter to Michael Boyle, re: replacement trees, telephone communication (1992).

Alexander, Pete, Fisheries Biologist, East Bay Regional Parks District, personal communication (1992).

Amendments to the Emergency Order for Fire Reconstruction and Information Regarding Emergency Preparedness in the City of Oakland (1992).

Amirzehni, Gus, Engineer, East Bay Municipal Utilities District, telephone communication (1992).

Barrozo, Lourdes, City of Oakland Department of Public Works, telephone communication (1992).

Beeman, Gary, Wildlife Biologist, telephone communication (1993).

Bellman, Lynn, Planning Division, City of Oakland Police Department, telephone communication (1992).

Blueford, Jerry F., Fire Marshall, City of Oakland (1992).

Boyle, Michael, letter to Mitch Thomson, tree reviewer, Parks and Recreation Department, re: tree preservation/tree removal/mitigations (1992).

Byers, Ken, Assistant Civil Engineer, Office of Public Works, City of Oakland, telephone communication (1992).

Cerruti, Paul, Operations Manager, Oakland Scavenger Company (1992).

Collins, Gary, Inspector, City of Oakland Fire Department, telephone communication (1992).

Daugherty, John, Controller, Altamont Landfill, telephone communication (1992).

Fahy, Orla, Planner II, City of Oakland (1992).

Fazio, J., Residential Supervisor, Oakland Scavenger Company, telephone communication (1992).

Garth, John S. and J.W. Tilden, California Butterflies (1986).

Harvey, Tom, Engineer, East Bay Municipal Utilities District, telephone communication (1992).

Hishida, Crystal K., Principal Administrative Analyst, Local Agency Formation Commission, County of Alameda, telephone communiction (1992).

Horvath, Cindy, AC Transit District, telephone communication (1992).

Karlton, Joanne, Biologist, California Department of Fish and Game, telephone communication (1993).

Kim, Dan, Engineer, East Bay Municipal Utilities District, telephone communication (1992).

Labadie and Associates, Horticultural Consultants, Correspondence to Mike Boyle, re: native trees, shrubs, and ground covers (1992).

Linde, Jan, Secretary, Research and Evaluation, Oakland Unified School District, telephone communication (1992).

Lindenmeyer, Tom, Environmental Specialist, East Bay Regional Park District, telephone communication (1992).

McGowan, William, Associate Civil Engineer, East Bay Municipal Utilities District, telephone communication (1992).

Miller, Warren, Engineer, Pacific Bell Telephone Company, City of Oakland, telephone communication (1992).

Moore, Steve, Engineer, Regional Water Quality Control Board, telephone communication (1992).

Muzar, Robert, Police Captain, City of Oakland Police Department, telephone communication (1992).

NiDana, Robin, Planner II, City of Oakland (1992, 1993).

Osalbo, Jun, Engineering Services, OPD, City of Oakland (1992).

Osur, Michael, Pre-Hospital Care Coordinator, Alameda County Department of Emergency Medical Services, telephone communication (1992).

Owen, David, Water Systems Unit, East Bay Municipal Utilities District, telephone communication (1992).

Palmisano, Terry, Wildlife Biologist, California Department of Fish and Game, telephone communication (1992).

Richards, Steve, Zoning Administrator, Alameda County Planning Department, telephone communication and office visit (1993).

Sloan, David, Business Representative, Pacific Gas and Electric, telephone communication (1992).

Sobrero, Traffic Engineering and Parking Division, City of Oakland (1992).

Vecchio, Michael J., Transportation Engineer, City of Oakland (1992).

Wengeler, Officer, Community Services Division, City of Oakland Police Department, telephone communication (1993).

Wong, Ken, Engineer, East Bay Municipal Utilities District, telephone communication (1992).

Yoloye, Jimi, Engineer, East Bay Municipal Utilities District, telephone communication (1992).

9. REFERENCES

Barbour, M.G. and J. Major, Terrestrial Vegetation of California (1977).

Beeman, Gary, Wildlife Biologist Consultant, "Alameda Whipsnake Evaluation on the proposed Redwood Creek Village Development," Alameda County, Oakland, California (1992).

Brockman, C.F., Trees of North America (1968).

Burt, Witt and R. P. Grossenheider, A Field Guide to The Mammals (1976).

California Department of Fish and Game, Alameda Whipsnake: Five Year Status Report (1987).

California Department of Fish and Game, California Natural Diversity Database, Oakland East 7.5 Minute Quadrangle (1987).

California Department of Fish and Game, Mammalian Species of Special Concern in California (1986).

California Native Plant Society, Inventory of Rare and Endangered Vascular Plants of California (1988).

Crittenden, M., Trees of the West (1977).

East Bay Municipal Utilities District (EBMUD), Non-Point Source Monitoring Program for the San Pablo, Briones, and Upper San Leandro Watersheds, 1990-1991 Draft Project Report (1991).

East Bay Regional Parks District, Rainbow Trout Information Placard, Redwood Regional Park (1991).

EIP Associates, Balmoral Annexation Draft Environmental Impact Report (1988).

EIR Balmoral Annexation, Thompson Traffic Engineers, Alameda, California.

FEMA, Flood Insurance Rate Map, Alameda County, California (1982).

Gall, G.A.E, and Boyd Bentley, Genetic Stock Identification Laboratory, Department of Animal Science, University of California, Davis, Genetic Isolation of Steelhead Rainbow Trout in Kaiser and Redwood Creeks, California, California Department of Fish and Game 76(4): 216-223 (1990).

Geometric Design Policy - ASSHT, 1984 Highway Design Manual, Caltrans - Ongoing.

Globe Soil Engineers, Addendum Soil Report Slope Stability Analysis (1992).

Globe Soil Engineers, Phase I (General) Soil/Geotechnical Report for 25-Acre Subdivision, Balmoral Drive, Oakland, Unincorporated Area of Alameda County, California (1990).

Golden Gate Audubon Society, Checklist of the Birds of the East Bay Region, California (1982).

Highway Capacity Manual, Highway Research Board (1965, 1985).

Holland, R., Vegetation Ecologist, California Department of Fish and Game, Preliminary Descriptions of the Terrestrial Natural Communities of California (1986).

Holland, V.L. and David Keil, California Vegetation (1986).

Institute of Transportation Studies Library, U.C. Berkeley.

Labadie and Associates, Horticultural Consultants, "Vegetation Survey of Redwood Creek Village" (1992).

LSA Associates, Oak Knoll Vista Estates Draft Environmental Impact Report, prepared for the City of Oakland (1990).

Lynn Bowers and Associates, Inc., "Redwood Creek Village Hydraulic Study" (1992).

Munz, Philip, A California Flora and Supplement (1959).

Oakland, City of, Open Space, Conservation, and Recreation Element, Oakland Comprehensive Plan (1976).

Oakland, City of, Tree Preservation Ordinance (1990).

Oakland, City of, Zoning Regulation (Ordinance No. 7248 C.M.S. as amended).

Soil Conservation Service, Soil Survey of Alameda County, California, Western Part (1981).

Staff Report to City Council (1992).

Stebbins, R.C., A Field Guide to Western Reptiles and Amphibians (1966).

U.S. Geological Survey, "The Loma Prieta Earthquake of October 17, 1989" (1990).

10. APPENDICES

A. ENVIRONMENTAL CHECKLIST AND INITIAL STUDY

B. LEAD AGENCY'S NOTICE OF PREPARATION

C. LETTERS OF RESPONSE TO THE NOTICE OF PREPARATION

D. PHASE I (GENERAL) SOIL/GEOTECHNICAL REPORT

E. ADDENDUM SOIL REPORT, SLOPE STABILITY ANALYSIS

F. REDWOOD CREEK VILLAGE HYDRAULIC STUDY

G. EAST BAY MUNICIPAL UTILITY DISTRICT, LANDSCAPE WATER CONSERVATION REQUIREMENTS

H. ORDINANCE NO. 0-89-45. AN ORDINANCE AMENDING CHAPTER 2 OF TITLE 8 OF THE ALAMEDA COUNTY ORDINANCE CODE RELATING TO ZONING

I. ALAMEDA WHIPSNAKE HABITAT EVALUATION ON THE PROPOSED REDWOOD CREEK VILLAGE DEVELOPMENT (#ER 91-108), ALAMEDA COUNTY, OAKLAND, CALIFORNIA, GARY A. BEEMAN, APRIL, 1992

J. DR. NAOMI SIMS RESUME

K. EMILE L. LABADIE ASSOCIATES REPORT ON SPECIES OF CONCERN, MARCH 29, 1993

L. APPLICANT PROVIDED PROTOTYPICALS OF HOMES

APPENDIX A

ENVIRONMENTAL CHECKLIST AND INITIAL STUDY

CITY OF OAKLAND

CITY HALL • ONE CITY HALL PLAZA • OAKLAND, CALIFORNIA 94612

Planning Department TTY 839-6451

December 4, 1991

Mr. Michael P. Boyle
12240 Blythen Way
Oakland, CA 94619

Re: Request for Environmental Review
Redwood Creek Village, East of Balmoral Drive

Dear Mr. Boyle:

In response to your Request for Environmental Review for the above referenced project, we have completed an Initial Study under the requirements of the California Environmental Quality Act. A copy of the Initial Study is enclosed. Based on the results of the Initial Study, we have determined that the project may have a significant effect on the environment and a Supplemental Environmental Impact Report (SEIR) is required. This determination may be appealed to the City Planning Commission, the decision of which is final.

The Initial Study has identified potential adverse effects of the project on the following environmental factors:

- Grading, topographic changes, and land stability.
- Drainage patterns and water quality, including effects on Redwood Creek.
- Wildlife habitats.
- Vegetation removal.
- Visual impacts on adjacent residential neighborhoods and regional parks.
- Cumulative impacts of this and other nearby projects on traffic.
- Local circulation impacts within the proposed project.
- Construction noise.
- Cumulative impacts of this and other nearby projects on public services, facilities, and utilities.

The SEIR must thoroughly discuss these possible adverse effects, mitigation measures that would reduce such effects to a level of insignificance, and alternatives that would avoid or reduce potentially significant adverse impacts. Alternatives discussed in the SEIR should include, but not be limited to, the following:

- No Project.
- Alternate sites.
- Project of reduced magnitude.
- Alternate designs for the proposed development incorporating appropriate mitigation measures.

We can provide a list of consultants who have previously prepared EIRs for the City. Although you, as project sponsor, are responsible for paying the consultant to prepare the SEIR, it is legally a City document. Therefore, whatever consultant is selected is subject to our approval and supervision. The consultant that is selected should prepare a written scope of work indicating how each potential impact identified by our Initial Study is proposed to be addressed in the SEIR. This scope of work should be forwarded to us as soon as possible for our review and approval. If it is not acceptable, it will be necessary to revise the scope of work and/or to select a different EIR consultant.

It must also be understood that once the EIR consultant is hired, its work is to be supervised by us. There is to be no contact between you and the consultant regarding the preparation or contents of the SEIR except as authorized by us. Of course, you will have the opportunity to review and comment on the draft SEIR, as will all other interested parties, but you are not to be provided with any preliminary drafts prior to publication of the draft SEIR.

The consultant must first prepare an "administrative draft SEIR" for our review. After we approve the administrative draft, it becomes a "draft SEIR" which we will then circulate to all interested parties for a 45-day review and comment period. During the comment period, the City Planning Commission will hold a public hearing on the draft SEIR. Following the comment period, a "final SEIR" must be prepared which responds to all comments received on the draft. This is also first prepared as an "administrative draft," which becomes a "final SEIR" after our review and approval. We will then submit it to the City Planning Commission for certification.

When the City Planning Commission is satisfied that the SEIR adequately addresses all potential impacts of the project, it will certify the document as being complete. Only then can the City act on any planning approvals required for the project. Please note that the City Planning Commission's certification of the final SEIR only verifies the completeness of the document; it does not imply approval of the project or any aspect of it.

Preparation of the SEIR requires payment by the project sponsor of the City's EIR fee. This fee is 10 percent of the EIR consultant's fee or $8,000, whichever is more. We will therefore need to know the EIR consultant's fee in order to prepare our EIR fee invoice. Please provide us with this information as soon as possible.

Please let us know as soon as possible whether you will be preparing an SEIR or appealing our determination to the City Planning Commission. Questions may be addressed to Charles S. Bryant, Environmental Review Coordinator, at 287-6346, or Orla Fahy, Assistant Planner, at 287-6342.

Sincerely,

ALVIN D. JAMES
Director of City Planning

Charles S. Bryant

By: CHARLES S. BRYANT
Environmental Review Coordinator

ADJ:CSB

Enclosure: Initial Study

ER91-108

_1E91108.OF

INITIAL STUDY
California Environmental Quality Act

I. DESCRIPTION OF THE PROJECT - Annexation of 29.5 acres from the County of Alameda into the City of Oakland and development of 25 acres within 36 single family dwellings. (see attachment for further details).

II. DESCRIPTION OF THE ENVIRONMENTAL SETTING - See Attachment

III. ENVIRONMENTAL EFFECTS

	Yes	Maybe	No	Source or Explanation
Geophysical. Will the proposal result in:				
1. Unstable earth conditions, including erosion or slides, or changes in geologic substructures either on or off the site?		x		see attachment
2. Major changes in topography or ground surface relief features?	x			see attachment
3. Construction on loose fill or other unstable land which might be subject to slides or liquefaction during an earthquake?		x		see attachment
4. Construction within one quarter mile of an earthquake fault?			x	
5. Substantial depletion of a nonrenewable natural resource or inhibition of its extraction?			x	
Air and Water. Will the project result in:				
6. Substantial air emissions, deterioration of ambient air quality or the creation of objectionable odors?			x	
7. Substantial degradation of water quality?		x		see attachment
8. Changed drainage patterns or increased rates or quantities of surface water runoff?		x		see attachment
9. Interception of an aquifier by cuts or excavations?			x	
Biotic. Will the project:				
10. Reduce the quantity of fish and wildlife in the project vicinity, interfere with migratory or other natural movement patterns, degrade existing habitats or require extensive vegetation removal?		x		see attachment
11. Reduce the numbers of any rare or endangered species of plants or animals?		x		see attachment
Land Use and Socio-Economic Factors. Will the project:				
? 12. Conflict with approved plans for the area or the Oakland Comprehensive Plan?			x	
13. Carry the risk of an explosion or the release of hazardous substances, including oil, pesticides, chemicals or radiation?			x	
14. Require relocation of residents and/or businesses?			x	
15. Cause a substantial alteration in neighborhood land use, density or character?	x			see attachment
16. Generate substantially increased vehicular movement or burden existing streets or parking facilities?		x		see attachment
17. Elicit substantial public controversy or opposition?		x		see attachment
18. Have a substantial impact on existing transportation systems or circulation patterns?		x		see attachment
19. Result in a substantial increase of the ambient noise levels for adjoining areas?		x		see attachment
20. Impose a burden on public services or facilities including fire, solid waste disposal, police, schools or parks?		x		see attachment
21. Impose a burden on existing utilities including electricity, gas, water, and sewers?		x		see attachment
22. Destroy, deface or alter a structure, object, natural feature or site of historic, architectural, archeological or aesthetic significance?			x	
23. Involve an increase of 100 or more feet in the height of any structure over any previously existing adjacent structure?			x	

ATTACHMENT TO INITIAL STUDY

I. DESCRIPTION OF THE PROJECT

This project is to annex 29.5 acres from the County of Alameda into the City of Oakland and to develop 25 acres with 36 Single Family Dwellings. This development, to be known as Redwood Creek Village, will have its access from Balmoral Drive and will be served by 2700 feet of private roadway. The site is located east of Balmoral Drive, north of Skyline High School, south east of Blythen Way and west of Redwood Regional Park.

History of the Project.

The applicant submitted a project in 1987 which was to annex 14.48 acres of which it was proposed to develop 10 acres with 13 single family dwellings. An Environmental Impact Report was prepared for this project and was certified by the City Of Oakland Planning Commission on November 16, 1988. However the City Council which is the final decision making body never certified the previous EIR nor approved the 1987 project . Under CEQA the Environmental Impact Report is designed to assess the impacts of the largest project that could be constructed under the designated zoning for that area. The previous EIR assessed developing 25 units on 14.48 acres as a "worst case scenario". The project now under review is for 36 units on 29.5 acres (greatest density permissible is 44 units). The mitigation measures previously proposed are no longer appropriate as they do not mitigate against the new "worst case scenario".

Cumulative Impacts.

Since the certification of the FEIR in 1988 several other projects within close proximity to the project site have been submitted to or approved by the City. The cumulative impacts of all of these projects need to be assessed. The projects are as follows:

OAK KNOLL VISTA	45 Units located near the intersection of Keller Avenue and Skyline Blvd.
OAKCREST PUD	32 units located at the intersection of Redwood Road and Crestmont Drive.
MAYER HEIGHTS	24 units located on the Oakland City and County of Alameda line uphill slope from Redwood Road, east of Skyline Blvd.
MONTEBELLO TERRACE	74 units located on Redwood Road, between Mountain Blvd and Campus Drive.
LEONA PARK VILLAS	24 townhouse units at the intersection of Redwood Road and Campus Drive.

II. DESCRIPTION OF THE ENVIRONMENTAL SETTING

Of the total 29.5 acres to be annexed, 4.5 acres are already developed. The developed portion is south of the proposed site for residential development and includes 2 acres owned by EBMUD which contains the Madrone Reservoir, and 2.5 acres owned by Oakland Unified School District and which is currently used as a parking lot for Skyline High School. Redwood Regional Park is located to the east of the project site; along the north and west of the project site are single family dwelling units on lots of area 5000 square feet or greater.

There are three existing single family dwelling units located on the 25 acres proposed for development. The site is dominated by three steeply sloping knolls. The vegetation cover is characterized by (1) Mixed Evergreen Forest which includes Redwoods, Madrone and Pines, (2) Northern Coastal Scrub and (3) Grasslands.

III. ENVIRONMENTAL EFFECTS - Source or Explanation

GEOPHYSICAL:

#1,2,3. The EIR prepared previously made reference to seismically induced landsliding being an important factor to be considered in terms of grading, foundation and structural design. This property is classified as Landslide Potential Zone III (very susceptible) in the Environmental Hazards Element of the General Plan. The project sponsor submitted a soils report prepared by Globe Soils Engineers as part of the package of information to be used to prepare an environmental review. The Office of Public Works reviewed the soils report and determined that it was of a very general nature and was not intended to fully characterize the subject site with regard to geologic features including on-site and near-site land stability. The Phase I geotechnical report does not provide sufficient additional information to evaluate geologic impacts of the proposed project. This issue needs to be addressed in detail in an Environmental Impact Report.

The estimated amount of grading for the proposed private roadway is between 7800 - 9000 cubic yards. No information is available with regard to the volume of grading necessary to facilitate the construction of the 36 proposed homes. The previous EIR did not specify the volume of grading that would be involved in developing the 10 acre site with 13 residential units. The project sponsor confirmed that all excavated material will be deposited on site as fill. No material will be exported from the site. The volumes of grading will lead to major changes in topography and will have an effect on aesthetics and drainage patterns that merit further study.

AIR AND WATER:

#7,8 Drainage from the site is northeast to Redwood Canyon Creek. Drainage from the project site could be problematic given the thin soil covering and impermeability of the underlying bedrock, and the number of trees that may need to be removed. The soils report submitted with the package of new information identifies mitigation measures to ensure "water ponding" on site does not occur. However, they confine their study to drainage as it relates to "built" structures. The report neglects to address the changes in drainage patterns that may occur as a result of the grading that will be required to facilitate development and in particular, the effect of such grading on Redwood Canyon Creek.

Some mitigation measures were proposed in the previous EIR; however, the changes in scale of the project, increased levels of grading and the increase in the number of trees needing to be removed could all have significant effects on the physical environment and require further study.

BIOTIC:

#10,11 Redwood Canyon is a protected wildlife habitat. The EIR previously prepared identifies Redwood Canyon Creek as the habitat for a genetically pure strain of Steelhead Trout. The creek is also a source of water for EBMUD Upper San Leandro Reservoir.

The previous EIR speaks in general terms about the wildlife known to exist in the Oakland Hills. It does not specify the methods used to observe wildlife nor does it identify particular habitats on the 14 acres involved in the previous proposal. The Alameda Whipsnake, an endangered species, may exist on this property as may a variety of wildlife, but the EIR is not very clear on specific species. The project sponsor and his horticulturalist in "casual observances" on site did not identify any rare or endangered species. However, there needs to be a more detailed study by a professional botanist of the impact developing the 29.5 acres would have on wildlife on site, and appropriate mitigation measures need to be designed to minimize any potential impacts.

During construction there exists potential for possible adverse effect on Redwood Canyon Creek due to sediment transportation into the Creek. Contaminated runoff could also prove detrimental to water quality. Contaminants can include debris and other particulate matter washed into the storm drains from yards and open areas; wastes from construction, renovation and demolition; dirt, oil, tire and exhaust residue contributed by automobiles; and fallout from airborne particles.

The project site is densely wooded; there are stands of homogenous redwoods, numerous madrones and coastal live oak throughout the site. The initial project to construct 13 dwelling units on 10 acres would have required taking out 125 redwoods. The number of trees to be removed for the current proposal was not addressed in the supplemental information submitted by the applicant. However the numbers that would have to be removed to facilitate development could result in a significant adverse impact and merits further study.

LAND USE AND SOCIO-ECONOMIC FACTORS:

#15. The previous EIR contained one photo montage; the City's current practice is to require at least four. Mitigation Measures were designed to minimize the visual impacts of developing 10 acres; however the project is now to develop 25 acres and the visual impacts and massing of structures will be much greater and requires further study. The impact of development on views from Redwood Regional Park needs to be assessed and mitigation measures identified to reduce the impacts of development on this regional open space. The effects of developing this expanse of open space for residential uses and the impacts on the surrounding residential neighborhood merits further study.

#16,18 Balmoral Drive currently serves 112 residences. An additional 36 units would lead to 30% increase in the volumes of traffic using Balmoral Drive. The previous EIR did not identify any adverse effects when considering the proposed development of a maximum of 25 units. The previous EIR determined that both the intersection of Balmoral Drive and Skyline Road and the intersection of Redwood Road and Skyline Road operated at Level of Service (LOS) A. This indicates free flow of traffic and average vehicle delays are five seconds per vehicle during peak hours. It is unlikely that the additional units proposed will have any adverse impacts on traffic and parking congestion by themselves.

However, since preparation of the previous EIR several other projects have been submitted to or approved by the City within the vicinity of the project site (see list above). The cumulative impacts on the existing public street network of the increased traffic generated by these residential projects needs to be assessed and appropriate mitigation measures, if needed, must be identified.

Concerning local circulation issues, the Office of Public Works has indicated that the width of the proposed private streets within the project may not be adequate. If additional width is required, it may lead to further grading, drainage, and tree removal impacts. The private street system should also be assessed by a licensed traffic engineer to ensure that sight distances, geometrics, and other relevant factors are adequate, and that there is sufficient maneuvering room for fire trucks and other emergency vehicles.

#17. The last project proposed for this site elicited much comment from the neighborhood. It is safe to assume that this new proposal will generate some controversy and the concerns of the neighborhood need to be addressed.

#19. During construction some noise impacts will be unavoidable due to construction. This project is to be constructed over a number of years therefore appropriate mitigation measures need to be identified to minimize the impacts on the surrounding residential neighborhoods.

#20,21 At present the land proposed for development is in the County of Alameda. Annexation and subsequent development will lead to a demand for city services e.g. police, fire, utilities,schools, open space etc. The previous EIR addressed these issues in terms of demand generated by 25 units. However the scale of the project has changed and also many other residential developments which will also make demands on the same city services have been submitted to or approved by the City since the EIR was prepared. The cumulative impacts of all these developments must be assessed to highlight any deficiencies in the provision of these services.

IV. MANDATORY FINDINGS OF SIGNIFICANCE

a. Possible impacts of the project, as described above, may have the potential to degrade the quality of the environment. The project may have the potential to cause the Steelhead Trout population in Redwood Creek to drop below self sustaining levels, and may reduce the number or restrict the range of a rare animal species, the Alameda Whipsnake.

c. The potential impacts of the project, as described above, may be individually limited, but cumulatively considerable. Also, potential impacts of this project, in combination with the potential impacts of other nearby projects recently submitted to or approved by the City may be cumulatively considerable.

d. Possible impacts of the project, as described above, may have direct or indirect substantial adverse effects on human beings.

V. DETERMINATION

The City of Oakland Planning Commission certified the Final EIR for the previous project in 1988. That project was to annex 14.48 acres into the City of Oakland and develop 10 acres with 13 residential units. The analysis carried out in the original EIR covers only 14 of the proposed 29.5 acres and assessed the impacts of 25 additional residences (as opposed to 36 now proposed and a maximum of 44 permitted) on the neighborhood and environment. Due to the increased scale of the project the mitigation measures designed for the initial project are no longer adequate and it is therefore determined that a supplemental Environmental Impact Report is required.

APPENDIX B

LEAD AGENCY'S NOTICE OF PREPARATION

CITY OF OAKLAND

CITY HALL • ONE CITY HALL PLAZA • OAKLAND, CALIFORNIA 94612

Planning Department

TTY 839-6451

NOTICE OF PREPARATION OF DRAFT ENVIRONMENTAL IMPACT REPORT

The Oakland City Planning Department is preparing an Environmental Impact Report (EIR) for the project identified below, and we are requesting your comments on the scope and content of the EIR. We have prepared an "Initial Study" that identifies areas of probable environmental effects. These probable environmental effects are summarized below. The Initial Study is available at the Department of City Planning.

The City of Oakland is the Lead Agency for this project, which means that we are the public agency with the greatest responsibility for either approving it or carrying it out. We are sending this notice to Responsible Agencies and other interested parties. Responsible Agencies are those public agencies, besides the City of Oakland, that also have a role in approving or carrying out the project. Responsible Agencies will need to use the EIR that we prepare when considering approvals related to the project.

When the Draft EIR is published, it will be sent to all Responsible Agencies and to others who respond to this Notice of Preparation or who otherwise indicate that they would like to receive a copy.

Please send us any response you may have within 30 days from the date you receive this notice. Your response, and any questions or comments, should be directed to Orla Fahy, Oakland City Planning Department, 421 14th Street, Oakland, CA 94612, telephone 238-6342. Please reference case number ER91-108 in your response.

PROJECT TITLE: Redwood Creek Village

PROJECT LOCATION: The 29.5 acre parcel located east of Balmoral Drive, north of Skyline High School, School, south east of Blythen Way and west of Redwood Regional Park (see Map on the reverse)

PROJECT SPONSOR: Michael P. Boyle

PROJECT DESCRIPTION: It is proposed to annex a 29.5 acre parcel of unincorporated land from the County of Alameda into the City of Oakland, it is then proposed to develop 25 acres with up to 44 single family dwellings. This residential development will be served by approximately 2700 feet of private road. The remaining 4.5 acres are developed, 1.5 acres is the property of the Oakland Unified School District and 2.5 acres is the property of the East Bay Municipal Utilities District.

PROBABLE ENVIRONMENTAL EFFECTS: Grading, topographic changes and land stability; Drainage patterns and water quality, particularly the impacts of increased contaminated surface runoff on the habitat of the rainbow trout in Redwood Creek; Wildlife Habitats; Vegetation Removal; Visual Impacts on adjacent residential neighborhoods and Redwood Regional Park; Cumulative Impacts of this and other nearby projects on traffic circulation; local circulation impacts within the proposed project; construction noise; cumulative impacts of this and other nearby projects on public services, facilities and utilities.

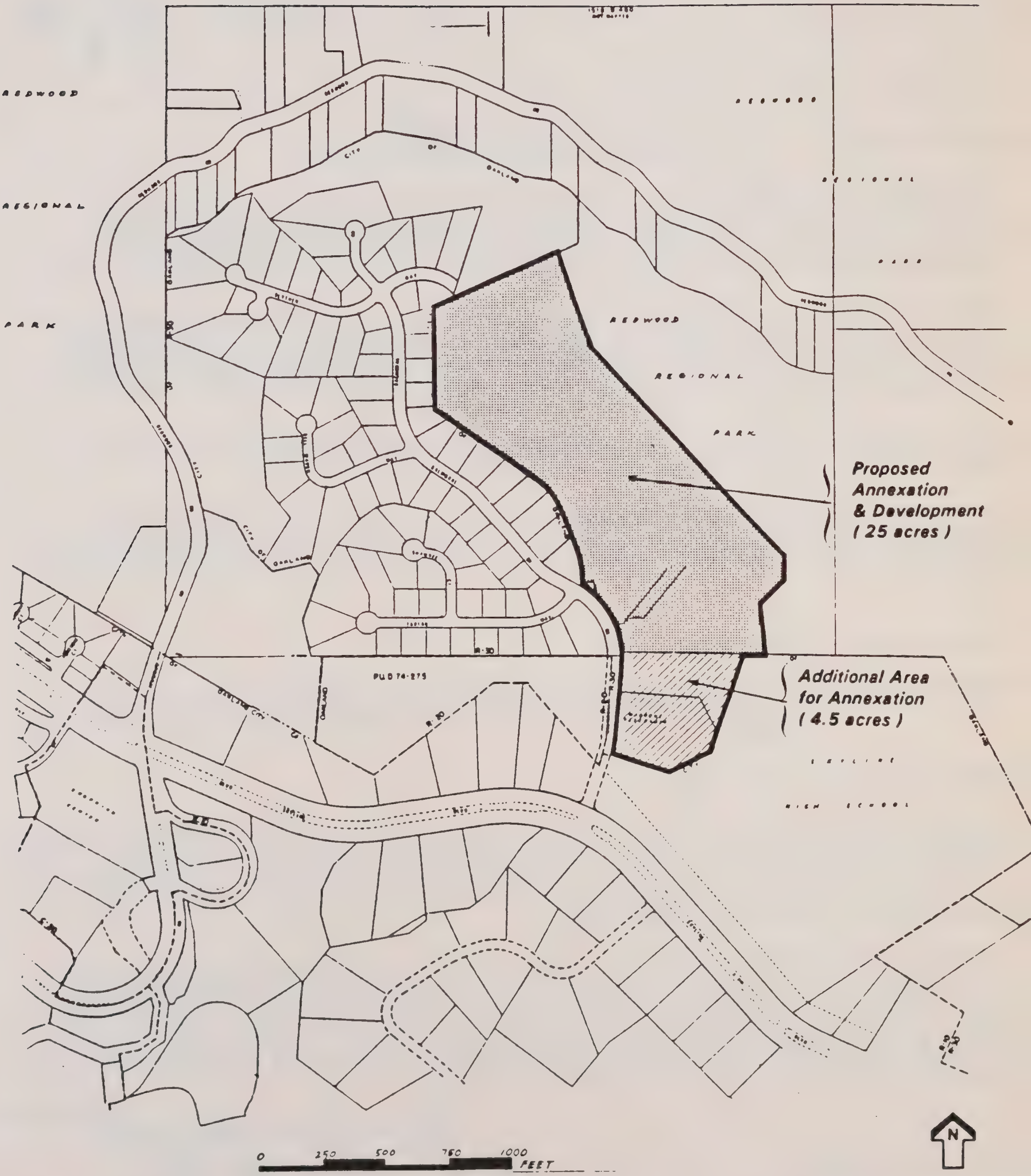
Charles S. Bryant

DATE: March 30, 1992

CHARLES S. BRYANT
Environmental Review Coordinator

File No. ER91-108

Form ER-16 (1/89)



Applicant: MICHAEL P. BOYLE
Project Location: Off Balmoral Drive, north of
Skyline High School and Skyline Blvd., Southeast of Blythen Way.
Case File No.: ER 91-108

APPENDIX C

LETTERS OF RESPONSE TO THE NOTICE OF PREPARATION

Orla Fahy
Oakland City Planning Department
421 14th Street
Oakland, CA 94612

CASE NUMBER **ER 91 108- REDWOOD CREEK VILLAGE**

To Whom It May Concern

I am writing to you to voice my opinion to the Draft Environmental Impact Report, Project Title, Redwood Creek Village.

I urge, Charles S. Bryant, Environmental Review Coordinator for the City of Oakland, **not to be biased** by certain members of the Balmoral Homeowners Association. By the way, this association only represents a **few neighbors** and not **all neighbors** in this area.

I have confidence in M. Boyle, and the Park Services Division, in **working out a solutio**n to the probable environmental effects outlined in your notice of March 30, 1992.

If the City of Oakland and the Park Service Division can approval of the projects just below Skyline, on Redwood Road, then I am sure that the quality project (Redwood Creek Village) M. Boyle is proposing will only benefit all concerned (even some **people ????)** living in this neighborhood.

Project ER91 108 has our approval.

Signed:

Donna & Matt Epstein 3/31/92

Donna and Matthew Epstein
12120 Tartan Way
Oakland, CA 94619

March 31, 1992

RECEIVED

APR 2 1992

CITY PLANNING COMMISSION
ZONING DIVISION

RECEIVED

APR 7 1992

PLANNING COMMISSION
DEVELOPMENT CONTROLS DIVISION

April 3, 1992

Orla Fahy
Oakland City Planning Department
421 14th Street
Oakland, California 94612

Re: Reference case no. ER 91-108
Project title: Redwood Creek Village

We are vehemently against Mr. Boyle's project to develop the 25 acres for 44 single family dwellings, located east of Balmoral Drive and south east of Blythen Way and west of Redwood Regional Park.

To sacrifice the wildlife habitats, vegetation removal especially of mature trees, and the future contamination and destruction of this beautiful Redwood Regional Park and its surrounding neighborhood for just money-making project cannot possibly be considered a positive impact on the entire community.

This project is too enormous to be able to withstand the compounded problems such as construction & traffic congestion, and the tremendous negative environmental effects it will cause and have not only to the present state but for the future years to come.

We want to preserve and protect the natural beauty and its wildlife of the Redwood Regional Park and its surrounding areas. We request the ER 91-108 project to be rejected for the reasons above.

Sincerely,

Dr. + Mrs. Ronald Iriyama

Dr. & Mrs. Ronald Iriyama
5871 Balmoral Drive
Oakland, California 94619

ALAMEDA COUNTY PLANNING DEPARTMENT

• *Development Planning* • *Housing & Community Development* • *Policy Planning & Research* • *Zoning Administration & Enforcement*

399 Elmhurst Street, Hayward, CA 94544 (510) 670-5400 FAX (510) 785-8793

April 15, 1992

Mr. Charles S. Bryant, Environmental Review Coordinator
City of Oakland Planning Department
One City Hall
Oakland, 94612

Dear Mr. Bryant:

SUBJECT: Notice of Preparation of Draft Environmental Impact Report, Redwood Creek Village, off Balmoral Drive, north of Skyline High School, File No. ER91-108

The only comment we have on the scope and content of the EIR is that it should cover the responsibilities and actions of the Local Agency Formation Commission, and address the findings which the LAFCo must make under the Cortese/Knox Act.

Thank you for the opportunity to comment on this matter.

Very truly yours,

Gerald R. Wallace

Gerald R. Wallace
Development Planning

EAST BAY
MUNICIPAL UTILITY DISTRICT

ENGINEERING DEPARTMENT
DENNIS L. ALLEN
CHIEF ENGINEER

DENNIS M. DIEMER
ASSISTANT CHIEF ENGINEER
JOHN B. LAMPE
MANAGER OF WATER PLANNING

May 7, 1992

Orla Fahy
Oakland City Planning Department
421-14th Street
Oakland, CA 94612

SUBJECT: Redwood Creek Village, Notice of Preparation of a Draft Environmental Impact Report

Dear Orla Fahy:

Thank you for opportunity to comment on the Notice of Preparation of a Draft EIR for the subject project. The District has the following comments regarding this project.

The District's comments are similar to our comments on Mr. Michael Boyle's previous project. Enclosed is our letter of October 3, 1988 for Mr. Boyle's previous project. Restrictions due to the prolonged drought conditions have been modified to permit outside landscaping with drought tolerant planting using a drip irrigation system and a limitation on turf areas to 25 percent of the landscaped area.

The District's concern for the protection of water quality in the District's Upper San Leandro Reservoir has not diminished. The developed area of the project site should be graded such that runoff does not flow to Redwood Creek. The District is firmly committed to the protection of water quality in all of the District's reservoirs. The District's concern is not only for the protection of the health and safety of District consumers, but also for the prevention of siltation that will reduce the available storage and shorten the useful life of the District's reservoirs.

This project will have an impact on the District's water supply. Water conservation should be incorporated into the design and construction of this project. The District has staff available to assist the project sponsor in the design of the landscaping and water conservation elements of the project.

375 ELEVENTH STREET . OAKLAND . CA 94607-4240 . (510) 835-3000
P.O BOX 24055 . OAKLAND . CA 94623-1055

If you have any questions, or if the District can be of further assistance, please telephone Mr. William W. McGowan, Jr., Associate Civil Engineer, Water Service Planning, at (510) 287-1031.

Very truly yours,

John B. Lampe

JBL:WWMcG:dd
Attachment

WWM92.9

EAST BAY MUNICIPAL UTILITY DISTRICT

LANDSCAPE WATER CONSERVATION REQUIREMENTS

GENERAL

Landscape design and practices and related requirements necessary to achieve water conservation in a development project shall be as follows:

1. All ornamental uses of water in the common areas of a development project, such as ponds, lakes and fountains, shall be supplied, operated, and maintained with alternative sources of water if they are available.

2. All new landscaping on parcels of 6,000 square feet or more in a development project shall be designed, developed, and maintained in accordance with these Landscape Water Conservation Requirements.

3. Each model home in a development project shall demonstrate a water conserving landscape as follows:

   o Turf shall be limited to 25% of the planted area.

   o Non-turf areas shall use water conserving plants.

   o Planting, soils, irrigation, and use of other materials shall be in accordance with these Landscape Water Conservation Requirements.

4. Landscape plans shall be submitted to the District for review as to conformance with these requirements. The Applicant shall allow a minimum of 30 days for each review of landscaping plans and each re-review in the case of non-conformance with these requirements. Landscaping shall not be installed until the Applicant receives the District's written acceptance of the landscape plans. Maintenance of the landscaping in accordance with the plan accepted by the District shall be a condition of continued water service to the premises.

PLANTING DESIGN

1. Plants shall be selected which are best suited to the climate of the region and which require minimal water.

2. Combined turf and decorative uses of water will be limited to reduce water use and evaporation. Turf limitations excluded for public parks, golf courses, cemeteries and school grounds.

3. In addition to water conservation, the landscape plan will address functional as well as energy use and environmental conditions specific to each individual site. By differentiating the site into watering zones, water can be used where it is most needed and use can be minimized in areas where it is little needed.

4. Turfgrass perimeters will be minimized to improve irrigation efficiency. Long, narrow strips of turfgrass such as traffic medians and between curbs and sidewalks will be avoided. For each of maintenance and reduction of runoff, groundcovers other than lawns will be used on slopes exceeding 4%.

SOILS

1. A minimum of 1-2 inches of mulch should be added to the soil surface to reduce evaporation, moderate soil temperatures, and discourage weeks.

2. A soils test shall be provided showing soil type, soil depth and uniformity and pH. Soils vary widely in their water-holding capacity from site to site. Soil types and depth, and the uniformity of the soil profile will determine how much water should be applied, and how much water runoff is likely to occur.

3. Grading shall be minimized to avoid soil disturbance. Topsoil shall be stockpiled for backfill.

IRRIGATION

1. Specifications for the irrigation system will include a watering schedule. To improve irrigation efficiencies, irrigation schedules should be set according to the plant's actual water needs. Turfgrasses should be irrigated a maximum of once every three days. the following schedule shows how many inches of water turfgrass needs monthly, based upon climatic data for area.

	Inches/Month			Inches/Month	
Date	Inland	Coastal	Date	Inland	Coastal
January	0	0	July	6	5
February	1	1	August	5	4
March	2	2	September	3	3
April	3	3	October	2	2
May	4	3	November	1	1
June	5	5	December	0	0

2. Drip, bubbler irrigation systems or low spray heads should be used for shrubs, trees and groundcovers.

3. Separate valves should be installed for turf and non-turf areas. In many cases, mature plants require only infrequent irrigation. Separation of valves can provide more water to shallow-rooted plants or to those in shallow soils which need more frequent watering and less water to deep-rooted, mature shrubs and trees. Separate valves will encourage plants to extend deeper roots and to become less dependent on frequent watering.

4. Sprinkler heads should have matched precipitation rates within each control valve circuit.

MISCELLANEOUS

1. Use inert material as appropriate for landscaping needs. Inert material or pavement over a portion of the site with the remainder in drought tolerant groundcover offers an alternative to unbroken expanses or turf. Inert material or paving may be necessary where continual or heavy traffic occurs.

2. Use porous paving materials. In order to improve the percolation of rainwater into the groundwater table, porous paving materials are preferred. Wood decking is a very water conserving landscape treatment. It shades out weeds, stands up under traffic, cools the soil beneath, reduces soil moisture evaporation, and allows infiltration of rainwater into the soil and into the groundwater table. Epoxy aggregate paving, mortarless tile pavers, open drainage channels, and gravel or bark paving reduce the need for supplemental irrigation, and may eliminate the need for costly subsurface storm drainage systems.

IRRIGATION MANAGEMENT

1. Water should be applied so that it soaks into the soil slowly.

2. The application rate should neither exceed 0.25" per cycle nor 0.75" per hour. Avoid runoff by discontinuing the application of water as soon as it occurs. Watering in stages will allow water to soak in between applications, thus improving the efficiency of water use.

3. Electric controllers should2 be set to water between 7:00 p.m. and 10:00 a.m. Nighttime and early morning irrigation will reduce evaporation losses.

EBMUD

EAST BAY MUNICIPAL UTILITY DISTRICT

RECEIVED
APR 09 1987
PROPERTIES

April 7, 1987

Mr. Tom Doctor
Secretary of the Planning Commission
Zoning Division, 2nd Floor
One City Hall Plaza
Oakland, CA 94612

Subject: Balmoral Drive Annexation, R87-99

Dear Mr. Doctor:

Thank you for the opportunity to comment on the proposed Balmoral Drive Annexation. As land owners in and adjacent to the proposed annexation, EBMUD would like to make the following comments.

The properties in the proposed annexation are either adjacent to or within the watershed tributary to EBMUD's Upper San Leandro Reservoir. Therefore, the development plans must include erosion control and municipal sewer service to protect the water supply. EBMUD requests that the District be included in the review of development plans prior to approval by the City.

Approximately 2.7 acres of the proposed annexation is outside of EBMUD's current water service boundary (see attached map). This portion would require annexation to EBMUD's service area to be eligible for water service.

EBMUD has no objection to inclusion of the Madrone Reservoir property (APN 85-102) in the Balmoral Drive Annexation to the City of Oakland. We understand that no annexation fees will be assessed.

Very truly yours,

RLKolm

RICHARD L. KOLM

RLK:KFB:ph

Attachment

bcc: R. L. Kolm (Chrono)
K. B. Stinson
S. Pineo
A. Martinez
L. J. O'Brien
K. F. Beckwith
File
OPRF
Rec. Mgmt.

WSP7.4379-87

EBMUD

EAST BAY MUNICIPAL UTILITY DISTRICT

October 3, 1988

Oakland City Planning Commission
6th Floor, City Hall
One City Hall Plaza
Oakland, CA 94612

Dear Commission Members:

SUBJECT: Balmoral Annexation Draft Environmental Impact Report

Thank you for the opportunity to review the subject environmental document. EBMUD has the following comments.

The developed area of the project site should be graded such that runoff does not flow to Redwood Creek. As cited on Pages 4-11 and 4-38, continued discharge of contaminated runoff can cause deterioration of water quality in Redwood Creek, and ultimately, the western arm of EBMUD's Upper San Leandro Reservoir. Upper San Leandro Reservoir is a source of drinking water to consumers living in the southern portion of EBMUD's Service Area, and as such, must be protected from any source of contamination.

EBMUD regulations for water use during the current water shortage emergency condition require applicants for new water service connections to agree to landscaping restrictions. For new services in Oakland, no use of outside irrigation water is allowed during the emergency.

Water conservation measures should be incorporated into the construction and landscaping to help mitigate the impact of additional water service demand on EBMUD's water supply. EBMUD encourages the use of equipment, devices and methodology for plumbing fixtures and irrigation that will provide for long-term efficient water use. EBMUD also encourages selection of lower-water requiring plants, use of inert materials, and limiting turf. EBMUD has conservation staff available to meet with and advise project applicants on conservation measures related to water service and landscaping.

If you have any questions or require further information, please contact Leo J. O'Brien, Senior Civil Engineer, Water Service Planning, at 891-0695.

Very truly yours,

CTWay

C. T. Way

CTW:WWMcG

Alan Silver
12150 Blythen Way
Oakland, Ca 94619
(510) 530-9359

April 1, 1992

Orla Fahy
Oakland City Planning Department
421 14th Street
Oakland, Ca 94612

re: Redwood Creek Village

Dear Ms. Fahy:

I am writing you to express my opposition to the proposed "Redwood Creek Village" developed by Michael P. Boyle.

I was born in Oakland, and except for a few years, have lived our City all of my life. I live in Oakland by choice, not out of necessity as I have reached that stage in my life where I can reasonably afford to live anywhere.

In addition to living in Oakland, I am active in youth activities sponsoring five Oakland Babe Ruth baseball teams and two Young America baseball teams. In addition, I am also active coaching in the program.

Neither of these facts may be important as relates to the "Redwood Creek" issue, but I include them to point out that I have deep commitment to our City.

Because of my heavy business and travel schedule, I have not taken part in my neighborhood's organized activities in opposition to the project but would like have my opinion included.

Each night, as I drive home from work, I travel up Redwood Road and am saddened by what has happened, and is happening, to that hill. What once was a mountain side covered with trees is now stripped and covered with high density housing.

I realize that our City continues to need increased housing which can create additional tax revenues but at some point we have to "draw a line" and attempt to preserve the surroundings that we treasure.

When I made a decision to continue to live in Oakland in 1983 I purchased my present home in the hills because it gave me much of a "country style" life with the benefits of the city.

I have continued to live there for those same reasons and the peace and harmony I feel as I sit on my deck and watch nature at work.....the sound of the creek, hawks circling above, the trees, the birds and even those pesky deer.

I see this project as the first step in a process that will take this away and to think otherwise, we are only fooling ourselves.

While school is in session we are increasingly faced with students trashing Balmoral and I am noticing many of them now parking in the residential area. I don't suggest that the school close but do point out that we are already experiencing additional traffic and don't need more.

Have you ever walked the paths of Redwood Park and looked across at our hills? If you have, you will recall that the current residential area has little negative visual impact but 44 more home, build within 25 acres will change that.

Although I am not a fisherman, the thought of Redwood Creek becoming polluted and the effect it would have on the rainbow trout is quite saddening. There is so little in our area not ruined by humanity that we need to preserve what is left.

I respect every person's right to make a dollar but do not believe that Mr. Boyle's project is in the best interest of our community.

I can certainly say that if it is approved, regardless of the current real estate market, I will put my house up for sale and move to another area.

Thank you for including my thoughts in your study.

Cordially,

Alan Silver

AS:sm

April 14, 1991

Ref no. ER91-108

Yes, we are concerned about about the proposal of "44" homes to be built in our area!

It's really a terrible idea - specially since "Firestorm" catastrophe we all experienced in October!

We have lived in our present home 22 years! and would be very fearful of having the congestion on our streets - since we only have one entrance and exit into "Hillcrest Highland" - which is Balmoral Dr.

over —

Things to Do TODAY!!

1.
2. signed,
3. George J Armigo
4.
5. Elaine C Armigo
6. 12121 - Blythen Way
7. Oakland CA 94619
8.
9. Please keep us posted as
10. ~~to~~ what is going on –
11.
12.

ALAMEDA COUNTY PLANNING DEPARTMENT

• Development Planning • Housing & Community Development • Policy Planning & Research • Zoning Administration & Enforcement

399 Elmhurst Street, Hayward, CA 94544 (510) 670-5400 FAX (510) 785-8793

April 28, 1992

Orla Fahy
Oakland City Planning Department
421 14th Street
Oakland, CA 94612

Re: Notice of Preparation
Redwood Creek Village EIR (ER91-108)

Dear Ms. Fahy:

Since this development proposal involves a request for annexation, the Alameda County LAFCO is a Responsible Agency and must rely upon the City of Oakland's EIR when considering the annexation request. As environmental staff to LAFCO, we recommend that the EIR discuss the proposed annexation in terms of the factors which LAFCO must consider in reviewing the proposal, as specified in the Cortese-Knox Local Government Reorganization Act of 1985. The relevant sections of the Act are enclosed.

Thank you for referring the Notice of Preparation to LAFCO. We look forward to reviewing the environmental document when it is complete. Please call me if you have any questions.

Sincerely,

Deborah Stein

Deborah Stein
Senior Planner/
LAFCO Environmental Staff

cc: Crystal Hishida, LAFCO Staff

enclosures

dis/lafco/response.nop

§ 56841. Factors to be considered [by LAFCO] in review of proposal

Factors to be considered in the review of a proposal shall include, but not be limited to, all of the following:

(a) Population, population density; land area and land use; per capita assessed valuation; topography, natural boundaries, and drainage basins; proximity to other populated areas; the likelihood of significant growth in the area, and in adjacent incorporated and unincorporated areas, during the next 10 years.

(b) Need for organized community services; the present cost and adequacy of governmental services and controls in the area; probable future needs for those services and controls; probable effect of the proposed incorporation, formation, annexation, or exclusion and of alternative courses of action on the cost and adequacy of services and controls in the area and adjacent areas. 'Services,' as used in this subdivision, refers to governmental services whether or not the services are services which would be provided by local agencies subject to this division, and includes the public facilities necessary to provide those services.

(c) The effect of the proposed action and of alternative actions, on adjacent areas, on mutual social and economic interests, and on the local governmental structure of the county.

(d) The conformity of both the proposal and its anticipated effects with both the adopted commission policies on providing planned, orderly, efficient patterns of urban development, and the policies and priorities set forth in Section 56377.

(e) The effect of the proposal on maintaining the physical and economic integrity of agricultural lands, as defined by Section 56016.

(f) The definiteness and certainty of the boundaries of the territory, the nonconformance of proposed boundaries with lines of assessment or ownership, the creation of islands or corridors of unincorporated territory, and other similar matters affecting the proposed boundaries.

(g) Consistency with city or county general and specific plans.

(h) The sphere of influence of any local agency which may be applicable to the proposal being reviewed.

(i) The comments of any affected local agency.

§ 56377. Policies and priorities; conversion of open-space lands

In reviewing and approving or disapproving proposals which could reasonably be expected to induce, facilitate, or lead to the conversion of existing open-space lands to uses other than open-space uses, the commission shall consider all of the following policies and priorities:

(a) Development or use of land for other than open-space uses shall be guided away from existing prime agricultural lands in open space use toward areas containing nonprime agricultural lands, unless that action would not promote the planned, orderly, efficient development of an area.

(b) Development of existing vacant or nonprime agricultural lands for urban uses within the existing jurisdiction of a local agency or within the sphere of influence of a local agency should be encouraged before any proposal is approved which would allow for or lead to the development of existing open-space lands for non-open-space uses which are outside of the existing jurisdiction of the local agency or outside of the existing sphere of influence of the local agency.

Definitions

§ 56016. **'Agricultural lands'** means land currently used for the purpose of producing an agricultural commodity for commercial purposes, land left fallow under a crop rotational program, or land enrolled in an agricultural subsidy or set-aside program.

§ 56059. **'Open space'** means any parcel or area of land or water which is substantially unimproved and devoted to an open-space use, as defined in Section 65560.

§ 56064. **'Prime agricultural land'** means an area of land, whether a single parcel or contiguous parcels, which has not been developed for a use other than an agricultural use and which meets any of the following qualifications:

(a) Land which qualifies for rating as class I or class II in the Soil Conservation Service land use capability classification.

(b) Land which qualifies for rating 80 through 100 Storie Index Rating.

(c) Land which supports livestock used for the production of food and fiber and which has an annual carrying capacity equivalent to at least one animal unit per acre as defined by the United States Department of Agriculture in the National Handbook on Range and Related Grazing Lands, July, 1967, developed pursuant to Public Law 46, December 1935.

(d) Land planted with fruit or nut-bearing trees, vines, bushes, or crops which have a nonbearing period of less than five years and which will return during the commercial bearing period on an annual basis from the production of unprocessed agricultural plant production not less than two hundred dollars ($200) per acre.

(e) Land which has returned from the production of unprocessed agricultural plant products an annual gross value of not less than two hundred dollars ($200) per acre for three of the previous five calendar years.

(f) Land which is used to maintain livestock for commercial purposes.

RECEIVED

APR 30 1992

PLANNING COMMISSION
DEVELOPMENT CONTROLS DIVISION
BY Hope

RECEIVED

1992

PLANNING COMMISSION
DEVELOPMENT CONTROLS DIVISION

April 28, 1992

Orla Fahy
Oakland Planning Department
421 Fourteenth Street
Oakland, CA 94512

Re: ER91-108 Redwood Creek Village

Dear Ms. Fahy:

We are generally satisfied with the "Initial Study" of the Draft Environmental Report to be conducted on the Redwood Creek Village project in our neighborhood.

However, we are most concerned about traffic in a catastrophic happening such as fire or earthquake since there will be only one ingress or egress to both our present subdivision and the one proposed by Michael Boyle. Consequently, during an emergency all traffic from the homes, plus that of Skyline High School would be emptying into the same intersection of Balmoral Avenue and Skyline Boulevard.

We would also like a study made of the effects of the 44 additional homes on the already severely overcrowded Carl Munck Elementary School and the cumulative impacts of this and other nearby projects.

Sincerely,

William Patterson

William Patterson, President
Balmoral Homeowners Association
5861 Balmoral Drive
Oakland, California 94619

;j

REGIONAL PARKS
EAST BAY REGIONAL PARK DISTRICT

RECEIVED

APR 2_ 1992

CITY PLANNING COMMISSION
ZONING DIVISION

April 17, 1992

Ms. Orla Fahy
Oakland City Planning Department
421 Fourteenth Street
Oakland, CA 94612

SUBJECT: DEIR for The Redwood Creek Village (ER91-108) - Redwood Regional Park

Dear Ms. Fahy:

The EBRPD has reviewed The Notice of Preparation for the subject document. The District requests that it address the same issues which were of concern in 1988 when a similar project (known as the Balmaral Annexation) was proposed on the same site.

The EIR should address erosion, siltation, and water quality issues in the context of adverse impacts downstream. The effects of erosion and siltation could result in increased downstream flooding due to reduced stream channel capacity; this could adversely effect adjacent EBRPD facilities including its Fire Station #2. The reduction in water quality, as a result of erosion related turbidity and urban runoff, could adversely impact aquatic life including the eggs and juvenile phases of California newts and the resident population of rainbow trout. Additionally, the physical alteration of trout spawning areas due to the deposition of silt could adversely effect the reproductive cycle of these trout; this population is descendent from those which the first scientific identification of the species was made. Since other trout populations have been affected by "genetic blending" as a result of the planting of hatchery - raised trout, this population represents an irreplaceable scientific reference point.

The EIR should address the visual effects of the project as viewed from the trails on the "West Ridge" portion of Redwood Regional Park.

The EIR should address the matter of wildfire spread from adjacent parklands to the proposed development. This discussion should note that the project site is currently within the Redwood Fire Protection District but that under automatic mutual aid agreements both the Oakland Engine Company #21 and the EBRPD Fire Station #2 (in Redwood Canyon) would respond. Because of proximity and other factors, Engine Company #21 would probably arrive first; they are primarily equipped and trained to respond to structural fires. The driving time from EBRPD Fire Station #2 about 7 minutes (without lights and siren). The station is staffed for 9 months of the year

2950 Peralta Oaks Court • P.O. Box 5381 • Oakland CA 94605 5369 • 510 635 0135 • FAX 510 569 4319

with a single full-time firefighter who is on duty 8 hours a day on weekdays. Other firefighters on duty to that station are employed full-time at other District jobs and job sites. They respond from their job site or from home in answer to emergency radio calls. Thus, if a fire occurred during a fire season weekday, the EBRPD could have a single vehicle on scene with a single firefighter in about 7 minutes. The other three vehicles at Fire Station #2, additional EBRPD firefighters, off season, and after-hours responses all would arrive at greater (and unpredictable) time intervals. EBRPD firefighters are primarily trained and equipped to respond to wildland fires. The discussion of mitigation measures should include implementation of the recommendations of the Blue Ribbon Committee Report on Fire Prevention at the Urban/Parkland Interface.

The contact person for the subject EIR is the undersigned who may be reached at 635-0135 x 2622.

Very truly yours,

T.H. Lindenmeyer
Environmental Specialist

THL:de

AC Transit
Alameda-Contra Costa Transit District

1600 Franklin Street, Oakland, California 94612 ☐ (510) 891-4862
FAX ☐ (510) 891-7157

SHARON D. BANKS
General Manager

RECEIVED

MAY 4 1992

CITY PLANNING COMMISSION
ZONING DIVISION

April 30, 1992

Ms. Orla Fahy
Planning Department
421 14th Street
Oakland, CA 94612

Dear Ms. Fahy:

SUBJECT: NOTICE OF PREPARATION FOR DRAFT ENVIRONMENTAL IMPACT REPORT (DEIR) FOR PROPOSED REDWOOD CREEK VILLAGE DEVELOPMENT (ER91-108)

The District would like to suggest the following comments for consideration by the City when preparing the DEIR on the Redwood Creek Village Development.

ANNEXATION CONSIDERATIONS

The parcel of unincorporated land to be annexed into the City of Oakland is not currently within AC Transit District's Special Service District #1. We suggest the City and the District investigate having this area annexed to Special Service District #1 at the same time LAFCO considers approval of the annexation. If this occurs, the district should then be able to participate in the negotiations of property tax redistribution.

TRANSIT CONSIDERATIONS

* The City and County should require transit mitigation of new developments for both Capital improvements and possibly operational costs, if transit services need to be added or enhanced due to new development.

* Agencies need to consider transit impacts of new developments as part of site "traffic" impact studies.

* The DEIR needs to include documentation of ridership and loads on transit lines serving new development, and assess impacts on usage (i.e., additional trips) on those lines. Currently, the southern most area of the proposed annexation is approximately one-quarter (1/4) mile from service on local route 46, and transbay route V. If trip generation cannot be absorbed with current transit capacity, the DEIR needs to address ways of mitigating these impacts.

* For low density projects such as this one, it is not likely transit service will be extended through it, therefore pedestrian access between existing transit service and the

development needs to be present and adequate. Sidewalks should be provided on both sides of all streets to provide access to bus stops.

Thank you for the opportunity to include our comments in the DEIR being prepared for this project. Please send us a copy when completed so that we may review and comment further. If you have any questions you can direct them to Cindy Horvath of my staff at 891-7132.

Very Truly Yours;

Ronald J. Kilcoyne
Manager, Research and Planning

RH/ch

cc: Kenneth O. Stanley, Assistant General Manager
Betty Blubaugh, District Secretary
Tom Babick, Associate Transportation Planner

ref: annexation

STATE OF CALIFORNIA—THE RESOURCES AGENCY

PETE WILSON, *Governor*

DEPARTMENT OF FISH AND GAME
POST OFFICE BOX 47
YOUNTVILLE, CALIFORNIA 94599
(707) 944-5500

May 1, 1992

CITY PLANNING DEPARTMENT
RECEIVED
MAY 4
File ER 91-108

Mr. Charles Bryant
City of Oakland
One City Hall Plaza
Oakland, California 94612

Dear Mr. Bryant:

Redwood Creek Village Notice of Preparation (NOP)
Oakland, Alameda County, Case #ER91-108

Department of Fish and Game personnel have reviewed the NOP for the Redwood Creek Village project. The project proposes to develop 44 homes on 25 acres. Department personnel have been on-site with City staff.

The draft Environmental Impact Report (EIR) should contain a complete description and map of the vegetation, including acreages. Impacts to habitats as a result of the project, and mitigation measures necessary to offset those impacts, should be identified and discussed.

Redwood forest covers a portion of the site adjacent to Redwood Regional Park. Because of the relatively limited amount of this habitat in the bay area, impacts should be reduced to the extent possible. The EIR should consider a reduced density alternative to preserve this habitat. For impacts which are unavoidable, mitigation should consider the purchase or deed restriction of an equivalent area of redwood forest for permanent open space.

The document should discuss all direct, secondary and cumulative impacts to Redwood Creek and its fishery. The Department is concerned for impacts from siltation and surface runoff from the site. Runoff containing detergents, fertilizers, pesticides, and oils would have a significant impact on the rainbow trout in the creek. Avoidance of impacts or specific and feasible means of mitigating the impacts must be included in the EIR.

Providing informational pamphlets to homeowners regarding runoff, often suggested in documents, may be advisable but should not be the only means of mitigation. The Department will be looking for specific and tangible measures to avoid or mitigate impacts. Such measures might include eliminating or reducing the number of homes within the Redwood Creek watershed, reducing grading, and requiring terracing of slopes to slow runoff and allow time for the water to soak into the ground. Other measures would include controlling construction period runoff, ensuring cement trucks do not wash out near storm drains, and requiring oil separators in the storm drain system. The City should require at least annual maintenance of all separators.

Surveys should be conducted for any rare, threatened or endangered species which may exist on site. Wildlife listed as species of special concern and Federal candidates, and plants listed by the California Native Plant Society (CNPS) should be included. The Department's Natural Diversity Data Base indicates the following plants are known from the area and should be considered: serpentine bunchgrass; Presidio clarkia; Alameda manzanita; and Diablo helianthella. Wildlife species include a snail (Helminthoglypta nickliniana bridgesi); bay checkerspot butterfly; Alameda whipsnake; burrowing owl; and Berkeley kangaroo rat. Surveys should be conducted at the proper time of year to locate these species. Impacts to sensitive species and their habitats should be avoided. Impacts which are unavoidable should be identified and appropriate mitigation provided.

During the site visit we recommended someone with Alameda whipsnake experience evaluate the site so a trapping program could begin immediately if it was deemed necessary. If trapping was necessary and did not begin at that time, survey work would be delayed until next year. Information regarding the whipsnake evaluation should be provided in the document.

The EIR should include a map of adjacent properties showing open space areas. Areas to be retained as open space on site should not be completely encircled by development as this decreases its value for wildlife. We recommend open space areas on and off site be connected by corridors to permit wildlife passage.

Survey results and specific mitigation measures must be included in the document. Surveys to be conducted at a later time, or mitigation measures to be identified at some future time, are not acceptable. Such studies and mitigation measures would be improperly exempted from the process of public scrutiny which is required under the California Environmental Quality Act (CEQA). A document which requests future studies or future identification of mitigation will be considered inadequate.

Department personnel are available to address our concerns in more detail. For information regarding fishery and reptile issues, please contact Ms. Patricia Anderson, Fishery Biologist, at (408) 353-2275. For wildlife issues, please contact Ms. Terry Palmisano, Associate Wildlife Biologist, at (510) 484-2586.

Sincerely,

Cindy Catalano

for Brian Hunter
Regional Manager
Region 3

cc: Mr. Tom Lindenmeyer
East Bay Regional Park District

Mr. Dale Bowyer
San Francisco Regional Water
Quality Control Board

Pacific Gas and Electric Company

1919 Webster Street
Oakland, CA 94612
510/835-8500

PG&E

April 28, 1992

CITY PLANNING DEPARTMENT
RECEIVED
MAY 4
File ER91-108

Mr. Charles S. Bryant
Environmental Review Coordinator
City of Oakland
One City Hall Plaza
Oakland, CA 94612

Re: Request for Comments
Notice of Preparation of Draft E.I.R.
Redwood Creek Village, R91-108
PG&E File No. 92-4-109

Dear Mr. Bryant:

We have received the above referenced notification and have the following comments:

Although PG&E's long-range plans provide for availability of gas and electricity to accommodate increased demand, delivery of gas and electric service to any particular development will need to be reviewed by PG&E as each development is proposed. Any new development will have a cumulative impact on PG&E's system and may require expansion of PG&E's system outside an individual development's boundaries.

To ensure that site development activities such as lot layout, building placement, grading, and landscaping do not adversely affect the safe, reliable operation of PG&E's facilities, developers should submit to PG&E all development plans which may adjoin any PG&E easements as soon as these plans are available. As a condition of approval of any proposed development, the City should require the developer to obtain PG&E's written consent to any development plans which may impact PG&E's easements.

If you have any questions regarding this matter, please call Mr. Mike Gigliotti of this office at (510)874-2326.

Sincerely,

J. M. DePaoli
Land Superintendent
Region General Services

APPENDIX D

PHASE I (GENERAL) SOIL/GEOTECHNICAL REPORT

PHASE I (GENERAL)
SOIL / GEOTECHNICAL REPORT

PROJECT LOCATION:

25 Acre Subdivision
Balmoral Drive, Oakland
Unincorporated Area of Alameda County, California

December 14, 1990

PREPARED FOR:

Mr. Michael Boyle
12240 Blythen Way
Oakland, CA 94619

GLOBE SOIL ENGINEERS

(Serving the Greater Bay Area Since 1976)

San Francisco Oakland Walnut Creek Pinole San Jose

MAIN ADDRESS: 41 SUTTER STREET, SUITE 1509, SAN FRANCISCO, CA 94104
PHONE: (415) 482-2276 or 1 (800) 344-SOIL, FAX: (415) 482-9101

December 14, 1990

Mr. Michael Boyle
12240 Blythen Way
Oakland, CA 94619

OUR PROJECT NO.: SR901008
PROJECT LOCATION:
25 Acre Subdivision, Balmoral Drive
Oakland, California

Dear Mr. Boyle:

In accordance with your request, we are pleased to submit this report of our geotechnical investigation for your proposed development of the site (25 Acre Subdivision) on Balmoral Drive, Oakland, the Unincorporated Area of Alameda County, California. This report presents the results of our investigation and gives recommendations for foundation support and drainage control for the proposed structures.

Based on our field, laboratory, and office studies, it is our opinion that from a soil and foundation engineering standpoint, the site is suitable for the development, provided that the recommendations presented in this report are incorporated into the design and construction of the proposed structures, garages/parking areas, and access driveways.

Please call me at (415) 482-2276 if you have any questions. Thank you.

Sincerely Yours,
Z. Aldine, Ph.D.
Supervising Engineer
California Soil (Geotechnical) Engineering License # 644
California Civil Engineering License # 28551
Exp. 3/31/94

CC:
Addressee (3)

REGISTERED PROFESSIONAL ENGINEER
ZUHAYR NIZAM-ALDINE
No. GE000644
Exp. 3/31/94
GEOTECHNICAL
STATE OF CALIFORNIA

Z. Ali

TABLE OF CONTENTS

ATTACHMENTS

1. PURPOSE AND SCOPE OF WORK

The purpose of this soil investigation of the site was to explore and evaluate the surface and subsurface soil conditions and, based on the information obtained, provide soil engineering recommendations relative to the development of a 25 acre single family residential subdivision at the site.

The scope of our work consisted of:
(1) review, compilation, and interpretation of available seismic, hydrologic, and geologic literature and maps pertinent to the site,
(2) field investigations including surface visual inspections and exploratory subsurface test pits and borings,
(3) laboratory testing to assess engineering properties of soil samples,
(4) recommendations for site preparation and drainage,
(5) an engineering analysis of appropriate foundation types and depths, including supporting capacities for design,
(6) development of recommendations for design lateral earth pressures and retaining walls,
(7) an engineering estimate of anticipated settlements for the proposed structures,
(8) recommendations for garage (parking area) and driveway designs, trenches, planting, and maintenance,
(9) preparation of an engineering report.

Our investigation was conducted in conformance with the ASTM Annual Standards (Refs. 19 & 20), ASCE Manuals (Ref. 21), Alameda County requirements, and the UBC Code (Ref. 22)

2. GENERAL BACKGROUND

A brief description of site location and proposed construction are given below.

2.1. SITE LOCATION

The proposed residential development (twenty five acres) is located on the eastern side of Balmoral Drive, near Skyline Blvd, Oakland, California, as shown on the Location Map, Figure 1. The lot sizes will approximately 1 acre each and are bounded by residential sites and a school. The site sits on a descending knoll within the Oakland Hills, with an approximate elevation of 1100 to 1200 foot.

2.2. PROPOSED CONSTRUCTION

It is our understanding that the proposed improvements will probably consist of two to three-story structures that are constructed on the gently sloping site. There will be garages (parking areas) off access driveways from Balmoral Drive. Building loads for the residences are expected to be typical for the proposed type of construction.

Since the site is sloping, retaining walls of variable heights may be required for the driveways, yards and some portions of the residences. Grading for the project will involve excavations, trenching and drilling into the hillside for the residences, garages, and access driveway, and the placement of backfill behind the retaining walls.

3. LITERATURE REVIEW

Available Literature, maps, and miscellaneous data pertinent to the site were reviewed, compiled, and interpreted. The information was obtained mainly from the sources listed below:

a) U.S. Geological Survey (USGS), and U.S. Department of Agriculture (Soil Conservation Service, SCS),
b) state geologic agencies, such as California Division of Mines and Geology (CDMG),
c) City of Oakland and Alameda County public files, and
d) U.C. Berkeley and Stanford University libraries, corporations, and private sources.

3.1. SEISMICITY

As with the rest of the San Francisco Bay Area, the site is considered to be in one of the most seismically-active regions of the United States. The nearest fault is the northwest-trending Hayward Fault, which lies about 1 mile to the west of the site (see the Seismicity Map, Fig. 2, taken from Ref.4). The site, therefore, lies outside the Alquist-Priolo Seismic Special Studies Zone boundaries.

Although research on earthquake prediction has greatly increased in recent years, seismologists have not yet reached the point where they can accurately predict when and where an earthquake will occur. Nevertheless, on the basis of current technology, and U.S. Geological Survey compiled data, it is reasonable to assume that the proposed structures will be subjected to at least one moderate to severe earthquake. The buildings should be structurally designed to withstand such an earthquake.

Six earthquakes with energies exceeding Richter magnitude 7 have occured in the last 150 years within the San Francisco Bay Area. The 1906 and 1989 San Andreas Fault earthquakes were the last of these major events. Present day seismicity is evidenced by moderate earth tremors and a slow, creeping movement on some active Bay Area faults.

The maximum probable seismic shock to be expected from the Hayward Fault is a 7.2 magnitude event on the Richter scale. The site and general area could experience bedrock accelerations of 0.5g. The site may be considered to be a firm site with a Characteristic Site Period (Ts) equal to 0.5 seconds and shock duration of 0.5 minutes, in accordance with the UBC Section 23.106(4A) and Standard 23-1.

3.2. GEOLOGY

Published data does not indicate the presence of any significant geological problems associated with the site.

Geologic maps covering the area indicate that the site is covered by a shallow soil layer of Millsholm silt loams, over layers of sandstone and siltstone of the Joaquin Miller Formation (Kjm) and the Oakland Conglomerate (Ko), as shown in the Geology Map (see Figure 3). According to the geologic references, slope stability and foundation conditions are good, and the rocks can be worked with standard power equipment used for drilling and grading.

3.3. HYDROLOGY

Published data does not indicate the presence of any significant hydrological problems associated with the site.

Rainfall at the site is about 26 inches per year (Fig. 4, taken from Ref.1), with about 80% of the rain falling between the months of November and April. This amount of rainfall is about average

for the Bay Area, which recieves from 14 inches per year along the Bay shore, to a maximum of 40 inches in the hills.

4. SITE INVESTIGATIONS

Our site investigations consisted of detailed surface site reconnaisances and inspections performed by the undersigned during October, 1990; and subsurface explorations, performed by our engineer in November, 1990, and consisted of exploratory borings, laboratory testing, and a geophysical seismic refaction survey.

4.1. SURFACE FEATURES AND CONDITIONS

A surface reconnaissance of the site was performed to evaluate the surficial site conditions and observe if any obvious indications of geotechnical or drainage problems were exposed. In addition, cut slopes on or adjacent to the site were also examined to provide supplemental information on the character of exposed soil materials and bedrock outcrops.

The majority of the lots at the building site are presently vacant, modrately vegetated, have few trees, and slope at about 10 to 30 pecent up and then down from Balmoral Drive.

The drainage on the site is split with some flowing towards Balmoral Drive and some towards Redwood Canyon Creek through four ravines. There is some evidence of a moderate flow across the site and most of the drainage occurs as sheet flow. No ponds, lakes, streams or other permanent water bodies exist on the site.

No major cracking from soil shrink/swell reaction and downward soil creep was observed on the slopes, probably because the Millsholm silt loams are moderately permeable and have a low shrink/swell index and plasticity index. No major slides or liquefactions were observed on the site at the time of our field work. The site appears not to have been significantly affected by the Great 100-Year Record Storm of January 4, 1982 and two successive very wet winters, and the prolonged Valentine' Day Storm of February 1986; nor by the October 17, 1989 Loma Prieta earthquakes.

4.2. GEOPHYSICAL INVESTIGATIONS

A limited geophysical seismic refraction survey was performed in order to assess the depths and elastic stiffness properties of soil and rock layers. Sufficient energy was released in the holes to record the soil-rock velocities and to map rock surface profile.

Three layers with differing velocities were discovered. The first is a low velocity, 2200 fps, topsoil or fill zone with an approximnate average thickness of 2 feet. The second was an intermediate stiffness with a velocity of about 3600 fps, a mixture of soil and rock, with an approximate average thickness of 4 feet. Finally, the third had a high velocity, about 9100 fps, representing a continuoum of bedrock layers.

4.3. SUBSURFACE INVESTIGATIONS AND LABORATORY TESTING

Historical background data, intensive visual inspections, and scanning of the site were used to decide on proper subsurface sampling locations.

The subsurface exploration consisted of 8 exploratory borings that were drilled to depths of 17 to 29 feet. The approximate locations of our exploratory borings are shown on the site Plan, Figure 5. Logs of our borings and details regarding our field and laboratory investigations are included in the attached Appendix A. Each of these borings penetrated the overlying soil and moderately into weathered bedrock.

The borings were drilled using a gas powered auger rig, 4 inch in diameter. Representative samples were obtained during drilling using a 2-inch modified California drive sampler. The sampler was driven into the soil or rock at the bottom of the hole with a 140-pound hammer falling 30 inches; the blows per foot were recorded as an indicator of the consistency or denseness of the soil penetrated. Samples were visually inspected, described and classified at the site and reinspected in the laboratory.

Laboratory determination of water content, dry density, unconfined compressive strength, shear strength, and Atterberg Limits were made for selected samples in order to evaluate the denseness, strength, and plasticity of the soil tested. The tests indicated that the soil deposits are considerably consolidated and are fairly stiff at depths greater than two feet.

The soils encountered in our borings and test pits generally consisted of a thin blanket (1 to 4 foot thick) of soft to firm silts and clayey silts with rock fragments, over weathered sandstone and siltstone bedrock. These soils possessed a low to medium plasticity and expansion potential. The soft-hardness bedrock layers were predominantly weathered and fractured sandstone and some siltstone. Our site reconnaissance and subsurface exploration confirmed that the materials shown on published geological maps were present.

The elevations of the borings were approximately determined by interpolation of topographic map contours.

Ground water was not found in any of our borings. It should be noted, however, that the borings and test pits may not have been left open for a sufficient period of time to establish equilibrium groundwater conditions. In addition, fluctuations in the groundwater level may occur due to variations in rainfall, temperature and other factors not evident at the time the measurements were made.

We wish to point out that the attached boring logs and related information depict subsurface conditions only at the approximate locations shown on the Site Plan and on the dates designated on the logs; subsurface conditions at other locations and times will differ somewhat from the conditions occuring at our boring locations.

5. DISCUSSION, CONCLUSIONS AND RECOMMENDATIONS

Based on our field and office studies, it is our opinion that from a soil and foundation engineering standpoint, the site is suitable for development, provided that the recommendations presented in this report are incorporated into the design and construction of the proposed structures, garages and access driveways. The potential for landsliding, liquefaction or subsidence of the native soils on the portion of the site to be developed is judged to be very low if the recommendations of this report are followed.

It is expected that since the site is gently sloping, only a small amount of grading will have to be performed. If the residences are located on the downslope sides of the driveways, then the foundations can be of the pier and grade beam type and the excavation operations will be limited to a minimum. Also, since the overlying soil layer is very thin (about 1 to 2 feet), the majority of the excavated materials will be bedrock which should not pose any hazard to increased erosion and sedimentation. However, our recommendations given in the following sections should be followed in order to mitigate any possible erosion.

General soil and foundation engineering recommendations for use in the design and construction of the proposed structures, garages and driveways are presented in the subsequent sections of this report. Upon your request, our firm will be avilable to:
(1) review the soil engineering aspects of the final grading and foundation plans prior to construction,
(2) observe the general excavation and drilling operations,
(3) observe and test the placement of any structural fill and backfill materials,
(4) observe the subgrade conditions in the foundation excavations,
(5) observe the installation of subsurface drains behind retainingwalls and under garage slabs, and
(6) observe the surface drainage facilities installed for the development.

5.1. SITE PREPARATION AND EARTHWORK OPERATIONS

The areas of the proposed improvements should be cleared and stripped to sufficient depth to remove any obstructions, debris and surface vegetation. These materials should be removed from the site. If any obstructions (such as tree root system) are removed below the planned finished grades, the resulting holes should be backfilled with approved materials that are compacted to the requirements given below. In the remaining areas, there should be as little disturbance as practical of the soil or covering vegetation during construction (or otherwise they should be properly landscaped).

All on-site materials below the stripped layer having an organic content of less than 3 percent by volume are suitable for use as fill and backfill materials (except where permeable materials is required). Any imported fill used at the site should be a non-expansive soil with a plasticity index of 12 or less. All fill and backfill materials placed at the site should not contain rocks or lumps greater than 6 inches in greatest dimension with not more than 15 percent larger than 2.5 inches.

All subgrade surfaces that will recieve fill, slab-on-grade or pavements should be scarified to depth of 12 inches, moisture- conditioned wet of optimum and compacted to the requirements given below.

All structural fill and backfill materials placed at the site should be compacted to at least 90 percent relative compaction by mechanical means only as determined by ASTM Test Designation D1557-78. The upper six inches of subgrade should be compacted to 95% density. The fill and backfill materials should be spread and compacted in lifts not exceeding 8 inches in uncompacted thickness.

We recommend that the existing slopes be left at their present inclinations. We also recommend that any new permanent cut or fill slopes have a maximum inclination of 2H:1V (any cuts steeper than that should be inspected and approved by our firm). At these inclinations, exposed slopes will probably be subjected to some minor sloughing and erosion, thus requiring periodic maintinance of the slopes. However, proper landscaping will help alleviate this problem.

5.2. DRAINAGE

It should be realized that considerable amount of runoff water from prolonged and intense rainfall flows along the surface of the ground. A significant amount of water may percolate through the upper portions of the top soil materials, then flows along the surface of impervious soil layers or along the surface of the bedrock because the bedrock is much more dense and compact than the above soil materials. Improvement of both the surface and subsurface drainage conditions is recommended to insure the stability of the site and to improve hydrologic conditions.

5.2.1. Surface Drainage

Positive surface drainage should be provided adjacent to the structures as to direct surface water away from foundations to suitable discharge facilities. Water should not be allowed to flow over the tops of any slopes and ponding of surface water should not be allowed adjacent to the structures. In addition, rainwater collected on the access driveway should be directed to suitable discharge facilities. The presence of some expansive soils makes this of great importance, as the introduction of water into this type of soil has the potential of heaving and de-compaction of fills and subbase materials. To minimize the potential for water ponding, we recommend that a gradient of at least 4% be established extending a minimum of 5 feet away from structures.

5.2.2. Subsurface Drainage

We recommend that subsurface drainage systems be installed beneath slabs. The subsurface drainage system should consist of 1-foot wide trenches that extend at least 1 foot below the rough pad grade of the slab. Four-inch diameter perforated pipes embedded in permeable materials (well-graded mixture of sand and gravel) should be installed at the bottom of the trenches, and the remaining portions of the trenches should be backfilled with permeable material. The permeable material in the trenches should be contiguous with the 4- to 6-inch layer of free-draining gravel required under slabs-on-grade, as recommended below under Section 5.4, "Slabs On Grade." The subdrains should be flushed and inspected for efficient flow before it is backfilled. Do not introduce surface runoff into the subdrains. Specific drainage requirements for retaining walls are presented below under Section 5.6, "Retaining Walls."

5.2.3. Roof Water

we recommend that rainwater collected on the roofs of the buildings be transported through gutters, downspouts and pipes to suitable discharge facilities. Do not allow downspouts to deposit runoff where it can saturate foundation soil. Do not use rock-filled sumps (French Drains).

To assist in maintaining proper drainage and erosion control measures at the site, we have attached Appendix B, "Guide to Maintenance of Homesites" and Appendix C, "Guide Specifications for Subsurface Drains."

5.3. FOUNDATIONS

It is recommended that the proposed structures be supported on one (or a combination) of the following foundation systems:
(a) drilled piers and grade beams foundations, or
(b) continuous (T or deep beam) footing foundations (recommended).
If more than one foundation system is used in a given structure, these systems should then be tied together with tie-beams.

5.3.1. Drilled Pier Foundations

The proposed structures should be supported on a grid of drilled cast-in-place straight-shaft piers that are designed to develop their load-carrying capacity through friction between the sides of the piers and the surrounding subsurface materials. Friction piers should have a minimum diameter of 16". The spacing of the piers should be determined by the structural engineer, but in no case should the center-to-center spacing of the piers be closer than three pier diameters.

All piers should extend to a minimum depth of 10 feet or at least 4 foot into the weathered bedrock materials that underlie the site, so that fixed-end moments can be developed. The actual length of the piers can be determined using an allowable skin friction value of 700 pounds per square foot for dead plus live loads with a one-third increase for all loads including wind or seismic. These values can be used starting at depth 2 foot below the bottom of the grade beams.

Soil creep will develop on slopes as a result of moisture fluctuations which cause the soil to swell and shrink. Creep pressures on piers and foundation grade beams which cross the slope may be approximated by a uniform lateral pressure of 100 pounds per square foot acting in the top five feet of soil.

We recommend that all the piers be reinforced with at least No. 5 bars that extend to the depth of the pier holes. We also recommend that all piers be tied together with tie-beams or grade beams that extend up and down the slopes between the piers as well as across the slope betwen the piers. The tie-beams and grade beams should also be tied into the adjacent mat and deep beam continuous footings. In addition, we recommend that all grade beams be designed to span betweeen the piers in accordance with structural requirements. We recommed that the steel from the piers extend sufficient distance into tie-beams and grade beams to develop its full strength in bond.

Even though the piers will be designed to develop their capacity through friction, their bottoms should be dry and reasonably free of loose cuttings prior to installing reinforcing steel and placing concrete. We wish to point out that some of the pier holes may encounter refusal short of their design depths; such piers will be evaluated on an individual basis at the time of construction.

5.3.2. Continuous Footing Foundations

Continuous "T" footings can be used for limited portions of the proposed structures and garages that extend over level cuts. These footings, however, should extend a minimum of 24 inches below grade.

These footings may be designed for the following allowable dead plus live load bearing pressures:

Depth Below Existing site Grades (Feet)	Allowable Dead+Live Load Bearing Pressure (Pounds Per Square Foot)
2 to 4	2000
4 to 7	3000
Below 7	5000

We wish to note that the above allowable bearing pressures may be increased by one-third to account for all loads including wind or seismic. We also wish to note that our allowable bearing pressures are net values; therefore, the weight of the footings can be neglected for design purposes. However, all footings should have a minimum width of at least 16 inches.

We recommend that all continuous footings be tied together with reinforcing steel to form a continuous grid. The footings should also be tied into any adjacent pier or mat foundations with tie-beams or grade beams.

5.4. SLABS-ON-GRADE

We recommend that slabs-on-grade be supported on a 4- to 6-inch layer of free-draining gravel that is contiguous with the permeable materials in the subsurface drainage systems recommended above. We also recommend that the upper 6 inches of the soil materials be compacted to at least 95 percent relative compaction as determined by ASTM Test Designation D1557-78.

Prior to final construction of the slabs, any loose materials at the subgrade level should be compacted to provide a smooth, firm surface for slab support. Slab reinforcing should be provided in accordance with the anticipated use and loading of slabs.

In any slab area where slab wetness would be undesirable, we recommend that an impermeable membrane be placed over the free-draining gravel and that the membrane be covererd with 2 inches of sand to protect it during construction.

5.5. RETAINING WALLS

We recommend that unrestrained walls with a level surface or with a sloping surfacer flatter than 4:1 be designed to resist an equivalent fluid pressure of 40 pounds per cubic foot. Where the sloping surface is at an inclination of 2:1 or slightly steeper, the unrestrained walls should be designed to resist an equivalent fluid pressure of 60 pounds per cubic foot. For walls with a sloping surface at an inclination of between 4:1 and 2:1, a straight line interpolation between the 40 and 60 pounds per cubic foot may be used.

If the structural engineer determines that there are any additional surcharge loads on the walls, the unrestrained walls should also be designed to resist an additional uniform pressure equivalent to one-third the maximum anticipated surcharge load applied at the surface behind the walls.

The above pressures assume that sufficient drainage will be provided behind the walls to prevent the build-up of hydrostatic pressures from the surface and subsurface water infiltration. Adequate drainage may be provided by a subdrain system consisting of either weep holes spaced at a maximum of 4-foot centers or 4-inch diameter perforated or slotted pipes bedded in permeable material (well-graded mixture of sand and gravel approved by our office). For both systems, the permeable materials placed behind the walls should be at least 1 foot in width and extend to within 2 feet of finished grade. The upper 2 feet of back fill should consist of compacted on-site materials. Weep holes should drain to suitable inlets and subdrain pipes should be connected to a system of closed pipes that lead to suitable discharge facilities. Any building retaining walls should be appropriately waterproofed, preferably by hot-mopping.

Surface ditches should be provided behind any walls that will have an exposed sloping surface draining towards them. These ditches, which will collest runoff water from the slopes, should be sloped to drain to suitable discharge facilities. The top of the walls should extend at least 1.5 feet above the ditch.

The walls can be supported on either pier or spread footing foundations that are designed in accordance with the recommendations presented previously under Sect. 5.3.1. "Drilled Pier Foundations" or 5.3.2. "Continuous Footing Foundations." Lateral load resistance can be developed in accordance with the recommendations presented below under 5.6. "Lateral Load Resistance."

5.6. LATERAL LOAD RESISTANCE

Lateral loads on piers may be resisted by passive pressures acting against the sides of the piers. We recommend a passive pressure equal to an equivalent fluid weighing 300 pounds per square foot per foot of depth to a maximum of 4000 pounds per square foot. This value can be assumed to be acting against 1.5 times the diameter of the individual pier shafts starting at a depth of 2 feet below the bottom of the grade beams.

Lateral loads on footings may be resisted by (1) friction between the foundation bottoms and the supporting subgrade materials and (2) passive pressures acting against the sides of the footings. We recommend the following coefficient of friction and passive pressures:

Depth Below Existing site Grades (feet)	Coefficient of Friction	Passive Pressures (Pounds Per Cubic Foot)
2 to 3	0.25	300
3 to 6	0.30	400
6 to 9	0.35	500
Below 9	0.40	600

We wish to note that the passive pressures presented above can be increased to a maximum value

of 5000 pounds per square foot. We also recommend that if a key is necessary to develop sliding resistance, it extend below the footing a minimum of one foot and that concrete be poured directly against the excavated bedrock materials.

We recommend that the factor of safety against sliding and over-turning for all retaining walls be at least 1.5. We wish to note that when calculating the weight of soil on the portion of the protruding wall footing where backfill will be placed (i.e. the weight of soil that will resist over-turning forces), an imaginary line at an inclination of 10 degrees from vertical can be used starting at thetop of the wall footing; in addition, the backfill materials can be assumed to have a unit weight of at least 110 pounds per cubic foot.

5.7. SETTLEMENTS

It is estimated that the post-construction settlement of the foundations under design loads should not exceed approximately 1/2 inch. Differential settlement between adjacent footings should not exceed one-half this amount.

5.8. ASPHALT PAVEMENT FOR DRIVEWAYS

Assuming that the subgrade materials in pavement areas will be similar to the overburden soils encountered in our borings, we have developed pavement design recommendations for the proposed roadway and driveways at the site. Our pavement design is based on a qualitative analysis of the anticipated subgrade materials ("R" value of 12) and assumes that traffic in the driveway area will consist of automobiles and light trucks (Traffic index of 4). With this criteria, we recommend that the pavement consists of 2 inches of asphaltic concrete over 8 inches of Class 2 aggregate base.

We wish to point out that the "R" (resistance) value and traffic index used in the above pavement design are considered reasonable values for the proposed driveway and should provide a 10- to 20-year pavement life with only a normal amount of flexible pavement maintenance required. Selection of the design parameters, however, was based on engineering judgement and not on "R" value tests or an equivalent wheel load analysis developed from a traffic study furnished to us.

We recommend that the pavements be constructed during the dry season to avoid saturation of the subgrade and base materials which often occurs during the wet winter months. Our experience indicates that pavements constructed during the dry season generally have a longer service life and require less maintenance than those constructed during the wet season.

We wish to point out that the final gradients in the driveway area should be established at the subgrade level by final grading this area to close tolerance. This will assure that the overlying baserock material has the required 8-inch thicknesses and that the asphaltic concrete surfacing has the required 2-inch thickness.

Asphaltic concrete, aggregate base and preparation of the subgrade should conform to and be placed in accordance with the California Department of Transportation Standard Specifications, except that the test method for compaction should be determined by ASTM Test Designation D1557.

At any locations where new pavements will abut landscaped areas, we recommend that the pavement baserock layer and subgrade soils be protected against saturation from water in the landscaped areas by means of a "redwood header-board," concrete curb and gutter or a thickened asphalt section. The "redwood header-board," concrete curb and gutter or thickened asphalt section should extend to a depth of at least 2 inches below the bottom of the baserock layer.

5.9. UTILITY TRENCHES

Shallow utility trenches will be able to withstand with only minimal bracing. The California Safety Orders requires more substantial bracing or shoring for trenches deeper than 5 feet.

Utility trenches should be designed to minimize the transmission of water into the subgrade soils beneath pavements, slabs on grade or structures. We suggest plugging the full depth of the trench with on-site, clayey soil for a distance of two feet on either side of such structures.

For the balance of this section of this report, "bedding" is described as that material placed around the pipe, such as sand or concrete, and "backfill" is that material placed in the trench above the bedding.

Unless concrete bedding is required, we recommend that imported free-draining sand be used as bedding. Sand bedding should be jetted into place. Jetting of sand should be closely supervised, and provisions made for the removal of excess water. Sand proposed for use as bedding should be tested to determine its suitability prior to its delivery to the site.

On-site, inorganic soils may be used as trench backfill. Such soils should be placed in 8 inch layers and compacted to achieve a density equivalent to at least 85% of the maximum dry density of the soil according to ASTM Test D1557-78. Contractors may use other compaction techniques, so long as the required density is achieved. Beneath pavements, foundations and concrete slabs on grade, trench backfill should be compacted to 90%. Beneath pavements, the surficial 6 inches of trench backfill should be compacted to 95%. Trench backfill should not be jetted.

5.10. PLANTING

We recommend landscape installation of plants that require minimum watering. Native trees may be encouraged to grow on the property in order to knit the surface soil together with roots. However, do not plant shallow-rooted trees so close to structures or pavements that root heave can occur. Use of automatic sprinkler systems is not recommended. Fresh slopes should be seeded and maintained to prevent erosion which can easily occur in the silty soils. In order to aid in the preparation of landscaping and erosion and sediment control plans, Appendix D "Vegetation and Erosion COntrol" is attached.

5.11. MAINTENENCE

Annual flushing with a garden hose of all underdrains, catch basins and downspouts is recommended. If any pipes become clogged, they should be cleared so that hydrostatic pressures do not reduce the shear strength of the soils.

6. LIMITATIONS

Our services were performed in accordance with generally accepted geotechnical engineering principles and practices. This warranty is in lieu of all other warranties either expressed or implied.

It must be thoroughly understood that the recommendations that are presented in this report should not be construed to be any type of long-term guarantee or insurance against future geotechnical problems that may occur at the site. We feel that the recommendations contained in this report will greatly reduce the risks of any future geotechnical problems, but any risk that still remains must be borne by the owners of the dwellings.

If you have any questions regarding this report, please call us at (415) 482-2276. We would appreciate at least 48 hours notice for our observations during construction.

Very truly yours,
Z. Aldine, Ph.D.
Supervising Engineer
California Soil (Geotechnical) Engineering Licence # 644
Exp. 3/31/94

REFERENCES

1. USGS, Bulletin 1398, Recent Landslides: An Estimate of Economic Losses and Correlations with Slope, Rainfall, and Ancient Landslide Deposits, Alameda County, California, by T. H. Nilsen, F. A. Taylor, and E. E. Brabb, 1976.

2. USGS, Map I-239, Areal and Engineering Geology of the Oakland West Quadrangle, California, by D. H. Radbruch, 1957.

3. USGS, Map I-298, Former Shoreline Features Along the East Side of San Francisco Bay, California, by D. H. Radbruch, 1959.

4. USGS, Map I-522, Approximate location of Fault Traces and Historic Surface Ruptures within the Hayward Fault Zone between San Pablo and Warm Springs, California, by D. H. Radbruch, 1967.

5. USGS, Map GQ-769, Geologic Quadrangle Maps of the United States, Areal and Engineering Geology of the Oakland East Quadrangle, California, by D. H. Radbruch, 1969.

6. USGS, Map MF-429, Geologic Map of Late Cenozoic Deposits, Alameda County, California, by E. J. Helley, K. R. Lajoie, and D. B. Burke, 1972.

7. USGS, Map MF-493, by T. H. Nilsen, 1973.

8. USGS, Map MF-519, by T. H. Nilsen, 1973.

9. USGS, Map MF-709, Maps Showing Maximum Earthquake Intensity predicted in the Southern San Francisco Bay Region, California, for Large Earthquakes on the San Andreas and Hayward Faults, by R. D. Borcherdt, J. F. Gibbs, and K. R. Lajoie, 1975.

10. USGS (Rantz), BDC 32, Isohyetal Map of the San Francisco Bay Region, 1971.

11. USGS, Professional Paper 941-A, Studies for Seismic Zonation of the San Francisco Bay Region, California, 1975.

12. USGS, Professional Paper 944, Relative Slope Stability and Land-Use Planning, Selected Examples from the San Francisco Bay Region, California, by T. H. Nilsen and R. H. Wright, 1979.

13. US Department of Agriculture, Soil Conservation Service, Soil Survey of Alameda County, California, September, 1977.

14. California Division of Mines and Geology (CDMG), various 7.5' quadrangle maps of the Alquist-Priolo Seismic Safety Hazard Zones.

15. CDMG, Special Publication 42, Fault Hazard Zones in California, 1976.

16. CDMG, Special Publilcatoin 62, Maximum Credible Earthquake Magnitudes for the Calaveras and Hayward Fault Zones, California, 1982.

17. Alameda County, Planning Department, Seismic Safety Element of the General Plan, 1975.

18. City of Oakland, Department of Public Works records.

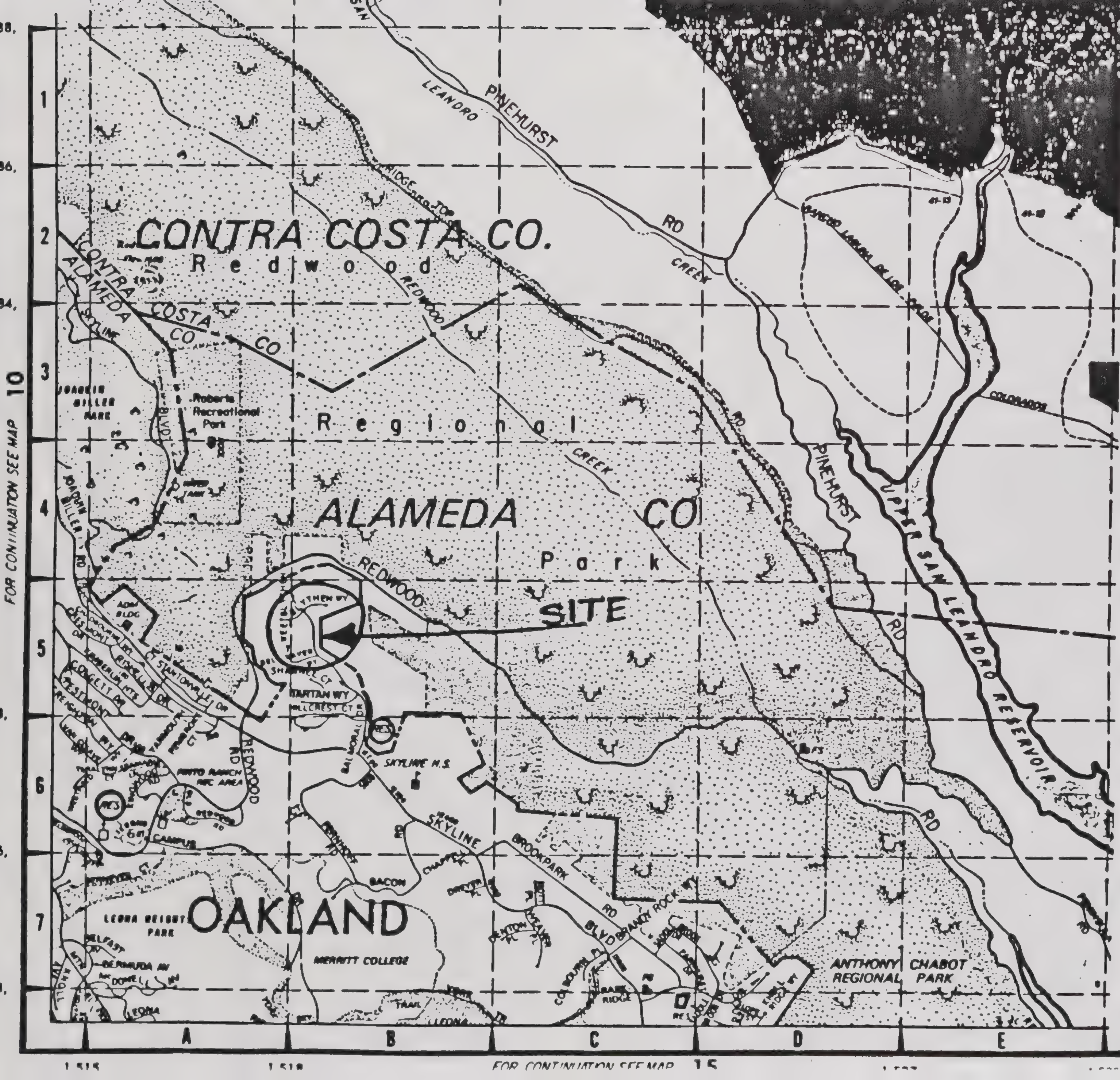
19. American Society for Testing Materials (ASTM), Annual Standards.

20. ASTM, Volume 4.08, Designation D 420 - 69, Standard Recommended Practice for Investigating and Sampling Soil and Rock for Engineering Purposes.

21. ASCE, Manual No. 56, Subsurface Investigation for Design and Construction of Foundations of Buildings, 1976.

22. Uniform Building Code, 1985 Edition.

23. Association of Bay Area Goverments (ABAG), Manual of Standards for Erosion and Sediment Control Measures, June 1981.



GLOBE SOIL ENGINEERS

LOCATION MAP

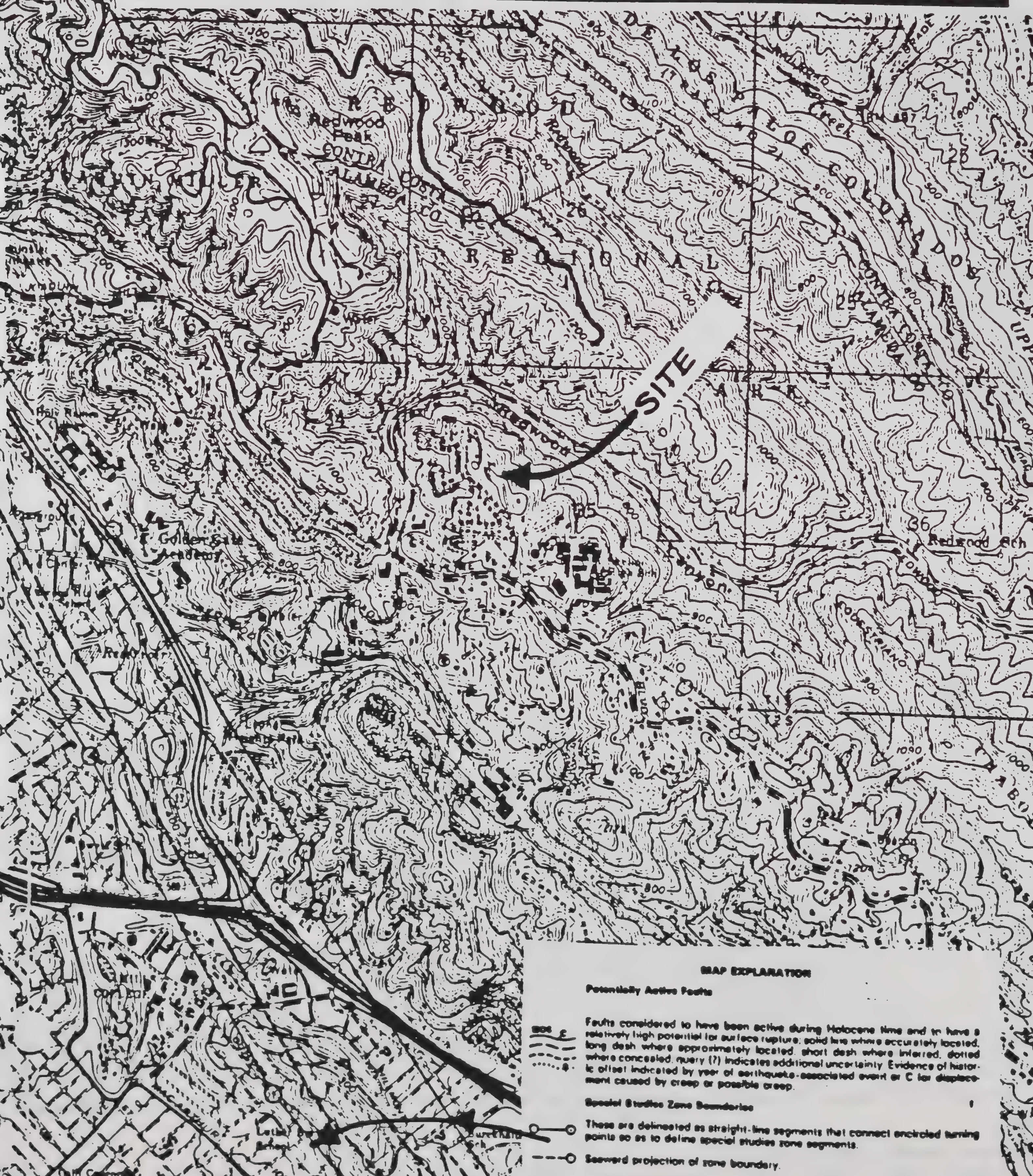
PROJECT NO: 901008

LOCATION: BALMORAL DRIVE
OAKLAND, CALIFORNIA

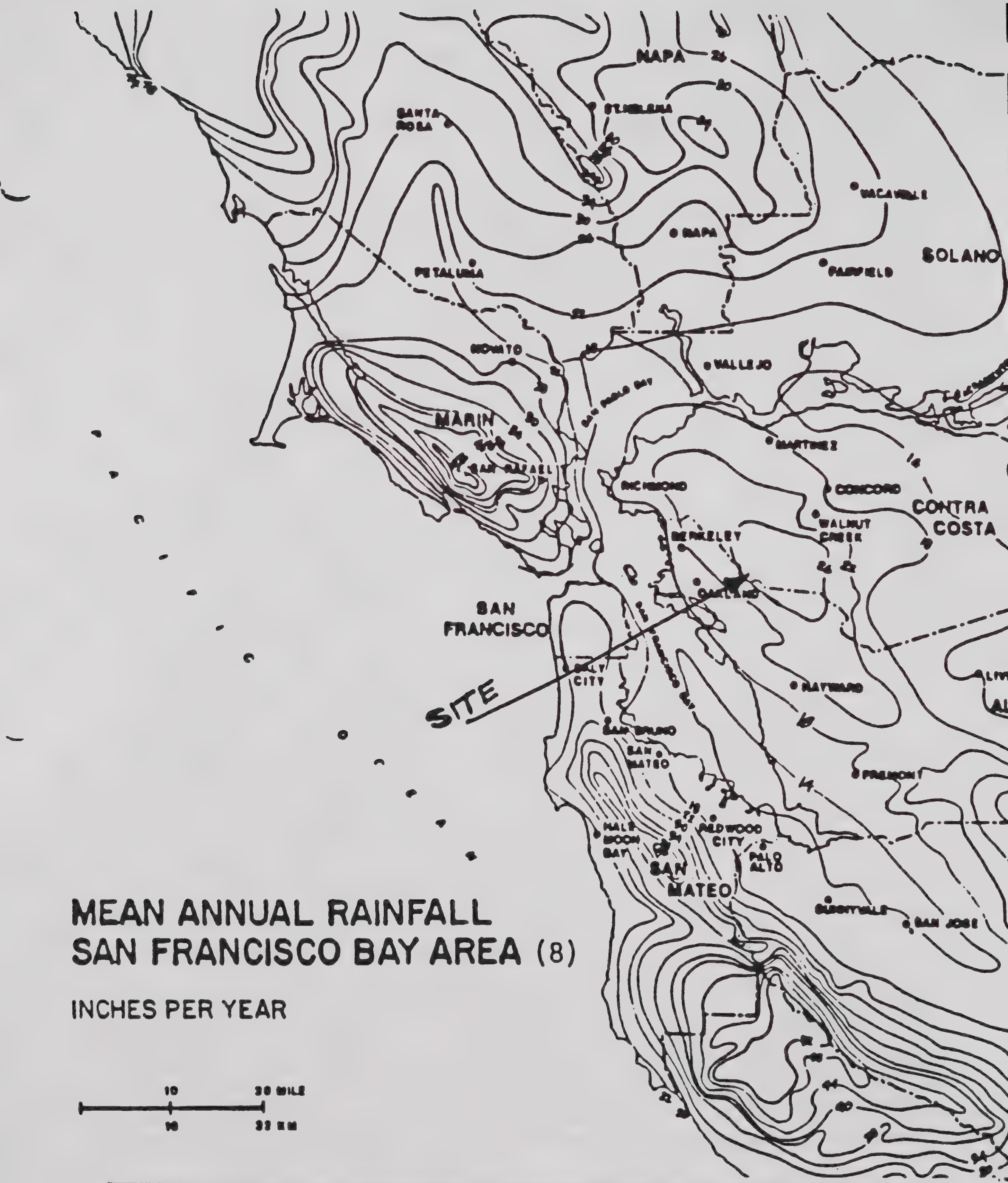
DATE: 12/14/90

FIGURE: 1

GLOBE SOIL ENGINEERS	PROJECT NO: 901008
	LOCATION: BALMORAL DRIVE OAKLAND, CALIFORNIA
SEISMICITY MAP	DATE: 12/14/90
	FIGURE: 2



GLOBE SOIL ENGINEERS	PROJECT NO: 901008
	LOCATION: BALMORAL DRIVE OAKLAND, CALIFORNIA
GEOLOGY MAP	DATE: 12/14/90
	FIGURE: 3



MEAN ANNUAL RAINFALL SAN FRANCISCO BAY AREA (8)

INCHES PER YEAR

GLOBE SOIL ENGINEERS	PROJECT NO: 901008
	LOCATION: BALMORAL DRIVE OAKLAND, CALIFORNIA
RAINFALL MAP	DATE: 12/14/90
	FIGURE: 4

APPENDIX A: FIELD AND LABORATORY INVESTIGATIONS

FIELD INVESTIGATION

The boring logs show our interpretation of the subsurface conditions on the dates and at the locations indicated and it is not warranted that they are representative of the subsurface conditions at other locations and times. Also, the stratification lines represent the approximate boundaries between the material types; actual transitions are gradual.

The materials encountered in the borings and test pits were continuously logged in the field by our engineer. Logs of our borings as well as a key for the classification of the soils encountered in the borings and test pits, Figure A-1, are included as part of this appendix.

Representative disturbed and undisturbed soil samples were obtained from the exploratory borings and test pits at selected depths appropriate to the soil investigation. The disturbed samples were obtained using a 2-inch O.D. split spoon sampler or were taken directly from the auger cuttings. The undisturbed samples were obtained with the Modified California Sampler. The type of sample shown on the logs is designated as follows:

Split Spoon Sample   Modified California Sample (2-inch I.D.)   Sample from Auger Cuttings

The standard penetration resistance blow counts were obtained with the split spoon sampler by dropping a modified 80-pound hammer through a 30-inch free fall. This hammer was also used to obtain samples with the Modified California Sampler. The samplers were driven 18 inches, or a shorter distance where hard resistance was encountered, and the number of blows were recorded for each 6 inches of penetration.

LABORATORY INVESTIGATION

The laboratory testing program was directed toward a quantitative and qualitative evaluation of the physical and mechanical properties of the materials underlying the site.

The natural water content was determined on 9 samples of the materials recovered from the borings; these water contents are recorded on the boring and test pit logs at the appropriate sample depths.

Dry density determinations were made on 3 samples of the materials recovered from the borings; the results of these tests are presented on the logs of borings at the appropriate sample depths.

Unconfined compression tests were performed on 3 of the more clayey samples of subsurface materials to evaluate the undrained shear strength of these materials. The unconfined compression tests were performed on samples having a height-to-diameter ratio of 2. Failure was taken at peak deviator stress or at 10 percent strain if no peak was evident. The results of these tests are presented on the logs of borings at the appropriate sample depths and are denoted (UC).

The shear strengths of the subsurface materials were also evaluated using a hand-operated penetrometer device. The shear strengths measured by this instrument were used in evaluating the consistency of the samples. The results of tests performed on the subsurface materials are shown on the boring logs and test pits at the appropriate sample depths and are denoted by (P).

An Atterberg Limit determination was performed on a sample of the more clayey near-surface soil to determine the range of water content over which this material exhibits plasticity and to estimate the expansion potential of the soil.

The percentage of particles passing the No. 200 sieve was determined on 2 samples of the subsurface materials underlying the site. These tests were performed to assist in the classification of the soils. The results of these tests are also presented on the logs of borings and test pits at the appropriate sample depths.

PRIMARY DIVISIONS			GROUP SYMBOL	SECONDARY DIVISIONS
COARSE GRAINED SOILS — MORE THAN HALF OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	GRAVELS — MORE THAN HALF OF COARSE FRACTION IS LARGER THAN NO. 4 SIEVE	CLEAN GRAVELS (LESS THAN 5% FINES)	GW	Well graded gravels, gravel-sand mixtures, little or no fines
			GP	Poorly graded gravels or gravel-sand mixtures, little or no fines
		GRAVEL WITH FINES	GM	Silty gravels, gravel-sand mixtures, non-plastic fines.
			GC	Clayey gravels, gravel-sand-clay mixtures, plastic fines.
	SANDS — MORE THAN HALF OF COARSE FRACTION IS SMALLER THAN NO. 4 SIEVE	CLEAN SANDS (LESS THAN 5% FINES)	SW	Well graded sands, gravelly sands, little or no fines.
			SP	Poorly graded sands or gravelly sands, little or no fines.
		SANDS WITH FINES	SM	Silty sands, sand-silt mixtures, non-plastic fines.
			SC	Clayey sands, sand-clay mixtures, plastic fines.
FINE GRAINED SOILS — MORE THAN HALF OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS — LIQUID LIMIT IS LESS THAN 50%		ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity.
			CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays.
			OL	Organic silts and organic silty clays of low plasticity.
	SILTS AND CLAYS — LIQUID LIMIT IS GREATER THAN 50%		MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts.
			CH	Inorganic clays of high plasticity, fat clays.
			OH	Organic clays of medium to high plasticity, organic silts.
HIGHLY ORGANIC SOILS			PT	Peat and other highly organic soils.

DEFINITION OF TERMS

U.S. STANDARD SERIES SIEVE — CLEAR SQUARE SIEVE OPENINGS

	200	40	10	4	3/4"	3"	12"
SILTS AND CLAYS	SAND			GRAVEL		COBBLES	BOULDERS
	FINE	MEDIUM	COARSE	FINE	COARSE		

GRAIN SIZES

SANDS AND GRAVELS	BLOWS/FOOT †
VERY LOOSE	0 - 4
LOOSE	4 - 10
MEDIUM DENSE	10 - 30
DENSE	30 - 50
VERY DENSE	OVER 50

RELATIVE DENSITY

SILTS AND CLAYS	STRENGTH ‡	BLOWS/FOOT †
VERY SOFT	0 - 1/4	0 - 2
SOFT	1/4 - 1/2	2 - 4
FIRM	1/2 - 1	4 - 8
STIFF	1 - 2	8 - 16
VERY STIFF	2 - 4	16 - 32
HARD	OVER 4	OVER 32

CONSISTENCY

† Number of blows of 140 pound hammer falling 30 inches to drive a 2 inch O.D. (1-3/8 inch I.D.) split spoon (ASTM D-1586).

‡ Unconfined compressive strength in tons/sq. ft. as determined by laboratory testing or approximated by the standard penetration test (ASTM D-1586), pocket penetrometer, torvane, or visual observation.

GLOBE SOIL ENGINEERS	ENGINEER: E. ALDINE FIGURE: A-1
KEY TO EXPLORATORY BORING LOGS	Unified Soil Classification System (ASTM D-2487)

REFUSAL

Unless otherwise noted on the Boring Logs, all subsurface soil investigations were carried down to a depth where our "refusals" were met with, whereupon the borings were terminated. The terminology of the word "refusal" does not necessarily mean that extremely hard rock material was encountered at that particular depth. It only implies that very hard material, possessing a bearing capacity generally higher than 10,000 lbs/sq.ft. was encountered.

Such material can indicate an extremely dense sedimentary rock of granular nature, quite heavily preconsolidated clays, a layer of "hardpan" formed within some of the weaker material by chemical action or by dessication, or it could also mean a layer of large boulders, a layer of sedimentary rock that underwent metamorphic phenomena, and finally it could also mean a layer of extremely hard igneous rock.

On the basis of the above, it should be observed that the word "refusal" is a subjective expression and this entails that when driving large piles or boring holes for cast-in-situ piers, a deeper penetration can be obtained although, at times, the "refusal" for driving piles or borings for piers can be encountered at a shallower depth than the depth at which our "refusal" was encountered. The latter generally depends on the equipment used and on the conditions of the terrain.

ROCK HARDNESS CRITERIA

Very Hard:	Cannot be scratched with knife or sharp pick. Breaking of hand specimen requires several hard blows of geologist's pick.
Hard:	Can be scratched with knife or pick only with difficulty. Hard blow of hammer required to detach hand specimen.
Moderately Hard:	Can be scratched with knife or pick. Gouges or grooves to 1/4 inch deep can be excavated by hard blow of point of a geologist's pick. Hand specimens can be detached by moderate blow.
Medium:	Can be grooved or gouged 1/16 inch deep by firm pressure on knife or pick point. Can be excavated in small chips to pieces about 1 inch maximum size by hard blows of the point of a geologist's pick.
Soft:	Can be gouged or grooved readily with knife or pick point. Can be excavated in chips to pieces several inches in size by moderate blows of a pick point. Small thin pieces can be broken by finger pressure.
Very Soft:	Can be carved with knife. Can be excavated readily with point of pick. Pieces 1 inch or more in thickness can be broken with finger pressure. Can be scratched readily by fingernail.

ROCK WEATHERING CRITERIA

Fresh:	Rock fresh, crystals bright, few joints may show slight staining. Rock rings under hammer if crystalline.
Very Slight:	Rock generally fresh, joints stained, some joints may show thin clay coatings, crystals in broken face show bright. Rock rings under hammer if crystalline.
Slight:	Rock generally fresh, joints stained, and discoloration extends into rock up to 1 inch. Joints may contain clay. In granitoid rocks some occasional feldspar crystals are dull and discolored. Crystalline rocks ring under hammer.
Moderate:	Significant portions of rock show discoloration and weathering effects. In granitoid rocks, most feldspars are dull and discolored; some show clayey. Rock has dull sound under hammer and shows significant loss of strength as compared with fresh rock.
Moderately: Severe:	All rock except quartz discolored or stained. In granitoid rocks, all feldspars dull and discolored and majority show kaolinization. Rock shows severe loss of strength and can be excavated with geologist's pick. Rock goes "clunk" when struck.
Severe:	All rock except quartz discolored or stained. Rock "fabric" clear and evident, but reduced in strength of strong soil. In granitoid rocks, all feldspars kaolinized to some extent. Some fragments of strong rock usually left.
Very Severe:	All rock except quartz discolored or stained. Rock "fabric" discernible, but mass effectively reduced to "soil" with only fragments of strong rock remaining.
Complete:	Rock reduced to "soil." Rock "fabric" not discernible or discernible only in small scattered locations. Quartz may be present as dikes or stringers.

GLOBE SOIL ENGINEERS	PROJECT NO: 901008
	LOCATION: BALMORAL DRIVE OAKLAND, CALIFORNIA
EXPLORATORY BORING LOG	DATE: 12/14/90
	BORING NO: 1

DRILL RIG: Portable Gas Auger	BORING DIAMETER: 4 Inch	LOGGED BY: WM
DEPTH TO GROUNDWATER: N/A	SURFACE ELEVATION: 1160	CHECKED BY: ZN

DESCRIPTION AND CLASSIFICATION				SYMBOL	DEPTH (FEET)	SAMPLE	PENETRATN RESISTANCE (BLOWS/FT)	WATER CONTENT (%)	DRY DENSITY (PCF)	SHEAR STRNGTH (KSF)
DESCRIPTION	COLOR	CONSIST.	SOIL TYPE							
CLAY, sandy with rock fragments and surface roots LL = 40% PI = 27%	Orange brown	Firm	CL		4		5	10	108	1.8 (UC)
SILT, with rock Passing #200 seive: 49%	light brown	Firm	ML		8		9	12		2.8 (P)
SANDSTONE	Gray brown	hard			12		39	12	118	
SANDSTONE	Gray	hard			16		69	14		
SANDSTONE weathered and. fractured. No caving No water Refusal.	Gray	Med-hardness			20					

BOTTOM OF BORING = 17 FEET

GLOBE SOIL ENGINEERS	PROJECT NO: 901008
	LOCATION: BALMORAL DRIVE OAKLAND, CALIFORNIA
EXPLORATORY BORING LOG	DATE: 12/14/90
	BORING NO: 2

DRILL RIG: Portable Gas Auger	BORING DIAMETER: 4 Inch	LOGGED BY: WM
DEPTH TO GROUNDWATER: N/A	SURFACE ELEVATION: 1200	CHECKED BY: ZN

DESCRIPTION AND CLASSIFICATION				SYMBOL	DEPTH (FEET)	SAMPLE	PENETRATN RESISTANCE (BLOWS/FT)	WATER CONTENT (%)	DRY DENSITY (PCF)	SHEAR STRNGTH (KSF)
DESCRIPTION	COLOR	CONSIST.	SOIL TYPE							
CLAY, silty with rock fragments and surface roots LL = 39% PI = 22%	Yellow brown	Soft	CL		5		4	11	106	2.6 (UC)
SILT, with rock Passing #200 seive: 56%	Light brown	Firm	ML		10		7	10		3.4 (P)
SANDSTONE decomposed. and weathered.	Gray brown	Hard			15		40	15	116	
SANDSTONE weathered .	Gray brown	Soft-hardness	Bed-rock		20		50	(MOISTURE) 18		
SANDSTONE	Gray brown	Med-hardness	Bed-rock		25					
SANDSTONE No caving Refusal	Gray brown	Med-hardness	Bed-rock				70	11	134	8.6 WET

BOTTOM OF BORING = 29 FEET

GLOBE SOIL ENGINEERS	PROJECT NO: 901008
	LOCATION: BALMORAL DRIVE OAKLAND, CALIFORNIA
EXPLORATORY BORING LOG	DATE: 12/14/90
	BORING NO: 3

DRILL RIG: Portable Gas Auger	BORING DIAMETER: 4 Inch	LOGGED BY: WM
DEPTH TO GROUNDWATER: N/A	SURFACE ELEVATION: 1150	CHECKED BY: ZN

DESCRIPTION AND CLASSIFICATION				SYMBOL	DEPTH (FEET)	SAMPLE	PENETRATN RESISTANCE (BLOWS/FT)	WATER CONTENT (%)	DRY DENSITY (PCF)	SHEAR STRNGTH (KSF)
DESCRIPTION	COLOR	CONSIST.	SOIL TYPE							
CLAY, sandy with rock fragments and surface roots LL = 38% PI = 23%	Yellow brown	Soft	CL				5	15	109	2.7 (UC)
SILT, with rock Passing #200 seive: 52%	Light brown	Firm	ML		5		9	13		3.2 (P)
SEDIMENTARY LAYER decomposed. rhythmically bedded.	Gray brown	Hard	SM		10		46	14	116	
SILTSTONE Breaks into small pieces.	Gray	Soft-hardness	Bed-rock		15		52	16		
SANDSTONE	Gray-brown	Med-hardness	Bed-rock		20					
SANDSTONE No caving Refusal	Gray-brown	Med-hardness	Bed-rock		25		77	10	136	9.1

BOTTOM OF BORING = 30 FEET

GLOBE SOIL ENGINEERS	PROJECT NO: 901008
	LOCATION: BALMORAL DRIVE OAKLAND, CALIFORNIA
EXPLORATORY BORING LOG	DATE: 12/14/90
	BORING NO: 4

DRILL RIG: Portable Gas Auger	BORING DIAMETER: 4 Inch	LOGGED BY: WM
DEPTH TO GROUNDWATER: N/A	SURFACE ELEVATION: 1100	CHECKED BY: ZN

DESCRIPTION AND CLASSIFICATION				SYMBOL	DEPTH (FEET)	SAMPLE	PENETRATN RESISTANCE (BLOWS/FT)	WATER CONTENT (%)	DRY DENSITY (PCF)	SHEAR STRNGTH (KSF)
DESCRIPTION	COLOR	CONSIST.	SOIL TYPE							
CLAY, sandy with rock fragments and surface roots LL = 39% PI = 28%	Yellow brown	Soft	CL		5		5	14	108	2.7 (UC)
SILT WITH ROCK Passing #200 seive: 64%	Light brown	Firm	ML		10		9	12		3.4 (P)
SEDIMENTARY LAYER decomposed. rhythmically bedded.	Gray brown	Hard	SM		15		36	14	116	
SANDSTONE Breaks into small pieces.	Gray	Soft-hardness	Bed-rock		20		39	19		
SANDSTONE No caving Refusal	Gray-brown	Med-hardness	Bed-rock		25					

BOTTOM OF BORING = 28 FEET

GLOBE SOIL ENGINEERS	PROJECT NO: 901008	
	LOCATION: BALMORAL DRIVE OAKLAND, CALIFORNIA	
EXPLORATORY BORING LOG	DATE: 12/14/90	
	BORING NO: 5	
DRILL RIG: Portable Gas Auger	BORING DIAMETER: 4 Inch	LOGGED BY: WM
DEPTH TO GROUNDWATER: N/A	SURFACE ELEVATION: 1000	CHECKED BY: ZN

DESCRIPTION AND CLASSIFICATION				SYMBOL	DEPTH (FEET)	SAMPLE	PENETRATN RESISTANCE (BLOWS/FT)	WATER CONTENT (%)	DRY DENSITY (PCF)	SHEAR STRNGTH (KSF)
DESCRIPTION	COLOR	CONSIST.	SOIL TYPE							
SILT, sandy with rock fragments and surface roots LL = 40% PI = 24%	Orange brown	Firm	ML				7	8	112	2.7 (UC)
SANDSTONE	Grey brown	med hard	rock		4		19	12		3.9 (P)
SANDSTONE	yellow brown	hard	rock		8		29	12	119	
SANDSTONE	Gray	hard			12		48	14		
SANDSTONE weathered and. fractured. No caving No water Refusal.	Gray	Med-hardness			16					
					20					

BOTTOM OF BORING = 17 FEET

GLOBE SOIL ENGINEERS	PROJECT NO: 901008
	LOCATION: BALMORAL DRIVE OAKLAND, CALIFORNIA
EXPLORATORY BORING LOG	DATE: 12/14/90
	BORING NO: 6

DRILL RIG: Portable Gas Auger	BORING DIAMETER: 4 Inch	LOGGED BY: WM
DEPTH TO GROUNDWATER: N/A	SURFACE ELEVATION: 1100	CHECKED BY: ZN

DESCRIPTION AND CLASSIFICATION				SYMBOL	DEPTH (FEET)	SAMPLE	PENETRATN RESISTANCE (BLOWS/FT)	WATER CONTENT (%)	DRY DENSITY (PCF)	SHEAR STRNGTH (KSF)
DESCRIPTION	COLOR	CONSIST.	SOIL TYPE							
CLAY, sandy with rock fragments and surface roots LL = 40% PI = 24%	Orange brown	Firm	CL				7	8	112	2.6 (UC)
SANDSTONE	Grey brown	med hard	rock		4		17	10		3.7 (P)
SANDSTONE	yellow brown	hard	rock		8		32	12	118	
SANDSTONE	Gray	hard			12		44	12		
SANDSTONE weathered and. fractured. No caving No water Refusal.	Gray	Med-hardness			16					
					20					

BOTTOM OF BORING = 16 FEET

GLOBE SOIL ENGINEERS	PROJECT NO: 901008
	LOCATION: BALMORAL DRIVE OAKLAND, CALIFORNIA
EXPLORATORY BORING LOG	DATE: 12/14/90
	BORING NO: 7

DRILL RIG: Portable Gas Auger	BORING DIAMETER: 4 Inch	LOGGED BY: WM
DEPTH TO GROUNDWATER: N/A	SURFACE ELEVATION: 1150	CHECKED BY: ZN

DESCRIPTION AND CLASSIFICATION				SYMBOL	DEPTH (FEET)	SAMPLE	PENETRATN RESISTANCE (BLOWS/FT)	WATER CONTENT (%)	DRY DENSITY (PCF)	SHEAR STRNGTH (KSF)
DESCRIPTION	COLOR	CONSIST.	SOIL TYPE							
CLAY, silty with rock fragments and surface roots LL = 44% PI = 27%	Yellow brown	Firm	CL		4		3	10	106	2.5 (UC)
SANDSTONE					8		19	9		4.0 (P)
SANDSTONE, weathrd and decomposed. Laminated and rhythmically bedded.	Gray brown	Soft-hardness	Bed-rock		12		46	11	117	
SANDSTONE, weathrd and laminated. Breaks into small pieces.	Gray	Soft-hardness	Bed-rock		16		64	19	117	
SEDIMENTARY LAYER No caving	Gray-brown	Med-hardness	Bed-rock		20					
SANDSTONE REFUSAL										

BOTTOM OF BORING = 20 FEET

GLOBE SOIL ENGINEERS	PROJECT NO: 901008
	LOCATION: BALMORAL DRIVE OAKLAND, CALIFORNIA
EXPLORATORY BORING LOG	DATE: 12/14/90
	BORING NO: 8

DRILL RIG: Portable Gas Auger	BORING DIAMETER: 4 Inch	LOGGED BY: WM
DEPTH TO GROUNDWATER: N/A	SURFACE ELEVATION: 1150	CHECKED BY: ZN

DESCRIPTION AND CLASSIFICATION				SYMBOL	DEPTH (FEET)	SAMPLE	PENETRATN RESISTANCE (BLOWS/FT)	WATER CONTENT (%)	DRY DENSITY (PCF)	SHEAR STRNGTH (KSF)
DESCRIPTION	COLOR	CONSIST.	SOIL TYPE							
CLAY, sandy with rock fragments and surface roots LL = 40% PI = 20%	Orange brown	Firm	CL		5		4	10	107	2.0 (UC)
SANDSTONE					10		28	12		4.2 (P)
CHERT, weathered, decomposed, Laminated and rhythmically bedded.	Gray brown	Soft-hardness	Bed-rock		15		39	12	117	
CHETRT, weatherd and laminated.	Gray	Soft-hardness	Bed-rock		20		62	11	118	
CHERT weathered and. fractured. No caving No water	Gray	Med-hardness	Bed-rock		25					
SANDSTONE REFUSAL										

BOTTOM OF BORING = 21 FEET

APPENDIX B: GUIDE TO MAINTENANCE OF HILLSIDE HOMESITES

During the wet weather season, home owners, particularly those living in houses placed on fills (man-placed earth) or in the vicinity of excavated (cut) or fill slopes, become concerned about the condition of their building site. In general, modern design and construction practice minimizes the probability of serious landsliding (slope failure). The grading codes of the local jurisdictions (cities and counties) in California concerning filled land, excavation, terracing, and slope construction are among the most stringent in the country and if followed are adequate to meet almost any natural occurrence. Therefore, the concern of the home owner should be directed toward maintaining slopes and drainage provisions and facilities so that they will perform as designed.

The following discussion, general recommendations, and simple precautions are presented herein to help the home owner maintain his hillside building site.

The general public often regards the natural terrain as stable -- "terra firma." This is of course, an erroneous concept. Nature is always at work altering the landscape. Hills and mountains are worn down by mass wasting (erosion, sliding, creeping, etc.) and the valleys and lowlands collect these products. Thus the natural process is toward leveling the terrain. Periodically (over tens of millions of years) major land movements rebuild mountains and hills and these processes begin over again. In some areas these processes are very slow and in others they are more rapid.

Development of hillsides for residential uses is carried out, in as far as possible, to enhance the natural stability of the site and to minimize the probability of instability resulting from the grading necessary to provide home sites, streets, yards, etc. This has been done by the developer and designers on the basis of geologic and soil mechanics investigations. In order to be successful, the slope and drainage provisions and facilities must be maintained by the home owner.

Home owners are accustomed to maintaining their homes, they expect to paint their house periodically, replace wiring, clean out clogged plumbing, repair roofs, etc. Maintenance of the home site, particularly on hillsides should--or must be considered on the same basis or even more serious basis because neglect can result in serious consequences. In most cases, lot and site maintenance can be taken care of along with landscaping and can be carried out cheaper to the home owner than repair after neglect.

Most slope and hillside lot problems are associated with water. Uncontrolled water from a broken pipe, cesspool or wet weather causes most damage. Wet weather is the largest cause of slope problems particularly in California where rain is intermittent, but may be torrential. Therefore, drainage and erosion control are the most important aspects of home site stability and these provisions must not be altered without competent professional advice, and maintenance must be carried out to assure their continued operation.

As Geotechnical Engineers concerned with the problems of building sites in hillside developments, we offer the following list of recommended "Do's and Don'ts" as a guide to home owners.

1. DO check roof drains and gutters and down spouts to be sure they are clear. Depending on your location, if you do not have roof gutters and down spouts, you may wish to install them because roofs and their wide, flat space, can shed tremendous quantities of water. Without gutters or other adequate drainage, water falling from the eaves collects against foundation and basement walls which can be undesirable.

2. DO clear surface and terrace drainage ditches and check them frequently during the rainy season, with a shovel, if necessary. Ask your neighbors to do likewise.

3. DO be sure that all drainage ditches have outlet drains that are open. This should be tested during dry weather. Usually this can be done simply with a hose. If blockage is evident, you may have to clear the drain mechanically.

4. DO check all drains at top of slopes to be sure that they are clear and that water will not overflow the slope itself, causing erosion.

5. DO keep subsurface drain openings (weep-holes) clear of debris and other material which could block them in a storm.

6. DO check for loose fill above and below your property if you live on a slope or terrace.

7. DO watch hoses and sprinklers. During the rainy season, little, if any, irrigation is required. Over-saturation of the ground is not only unnecessary, and expensive on the water bill, but can cause subsurface damage.

8. DO watch for water backup of drains inside the house and toilets during a rainy season, since this may indicate drain or sewer blockage.

9. DO exercise ordinary precaution. Your house and building site were constructed to meet certain standards which should protect against any natural occurrence, if you do your part in maintaining them.

---

1. DON'T block terrace drains and brow ditches on slopes or at the tops of cut or fill slopes. These are designed to carry away runoff to a place where it can be safely distributed. Generally, a little shovel work will remove any accumulation of dirt and other debris which may clog the drain. If several homes are located on the same terrace, it is a good idea to check with your neighbors. Water backed up on their property may eventually reach you. Water backed up in surface drains will tend to overflow and seep into the terraces, creating less stable slopes. Maintain the ground surface upslope of lined ditches to ensure that surface water is collected in the ditch and is not permitted to be trapped behind or under the lining.

2. DON'T permit water to collect or pond on your home site. Water gathering here will tend to either seep into the ground loosening fill or natural ground, or will overflow into the slope and begin erosion. Once erosion is started, it is difficult to control and severe damage may result rather quickly.

3. DON'T connect roof drains and gutters or down spouts to subsurface drains. Rather, arrange them so that water either flows off your property in a specially designed pipe or it flows out into a paved driveway or the street. The water then may be dissipated over a wide surface or preferably be carried away in a paved gutter or storm drain. Subdrains are constructed to take care of ordinary subsurface water and cannot handle the overload from roofs during a heavy rain.

4. DON'T permit water to spill over slopes, even where this may seem a good way to prevent ponding. This tends to cause erosion and, in the case of fill slopes, can eat away carefully designed and constructed sites.

5. DON'T drop loose soil or debris over slopes. Loose soil soaks up water more readily than compacted fill. It is not compacted to the same strength as the slope itself and will tend to slide when laden with water and may even affect the soil beneath it. The sliding may clog terrace drains below or may cause additional damage in weakening the slope. If you live below a slope, try to be sure that loose fill is not dumped above your property.

6. DON'T discharge water into subsurface blanket drains close to slopes. French drains are sometimes used to get rid of excess water when other ways of disposing of water are not readily available. Overloading these drains saturates the ground and, if located close to slopes, may cause slope failure in their vicinity.

7. **DON'T** discharge surface water into septic tanks or leaching fields. Not only are septic tanks constructed for a different purpose, but they will tend, because of their construction, to accumulate additional water naturally from the ground during a heavy rain. Overloading them artificially during the rainy season is bad for the same reason as subsurface subdrains, and is doubly dangerous since their overflow can pose a serious health hazard. In many areas the use of septic tanks should be discontinued as soon as sewers can be made available.

8. **DON'T** over-irrigate slopes. Naturally, ground cover of ice plant and other vegetation will require some moisture during the hot summer months, but during the wet season, irrigation can cause ice plant and other heavy ground cover to pull loose which not only destroys the cover, but also starts serious erosion. In some areas ice plant and other heavy cover can cause surface sloughing when saturated due to the increase in weight and weakening of the near surface soil. Planted slopes should be planned where possible to acquire sufficient moisture when it rains.

9. **DON'T** let water gather against foundations, retaining walls and basement walls. These walls are built to withstand the ordinary moisture in the ground and are, where necessary, accompanied by subdrains to carry off excess. If water if permitted to pond against them, it may seep through the wall causing dampness and leakage inside the basement, it may cause the foundation to swell up, or the water pressure could cause structural damage to walls.

10. **DON'T** try to compact earth behind walls or in trenches by flooding with water. Not only is flooding the least efficient way of compacting fine grained soil, but could damage the wall foundation or saturate the subsoil.

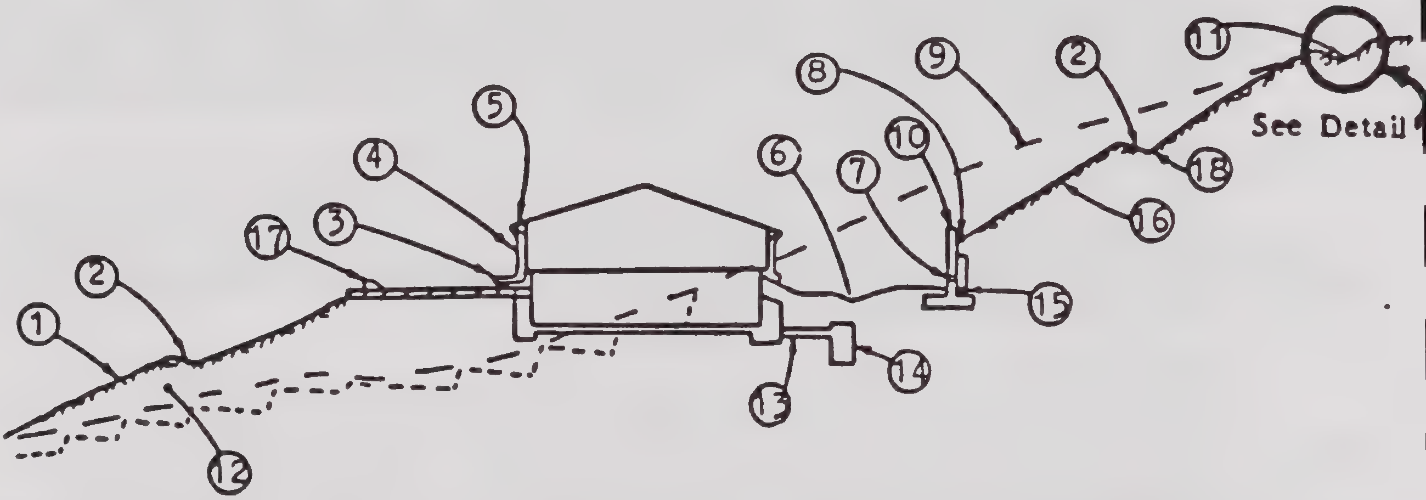
11. **DON'T** leave a hose and sprinkler running on or near a slope, particularly during the rainy season. This will enhance ground saturation which may cause damage.

12. **DON'T** block ditches which have been graded around your house or the lot pad. These shallow ditches have been put there for the purpose of quickly removing water toward the driveway, street or other positive outlet. By all means, do not let water become ponded above slopes by blocked ditches.

A typical slope section showing various grading and drainage requirements as well as terms used for hillside developments is attached as Figure B-1.

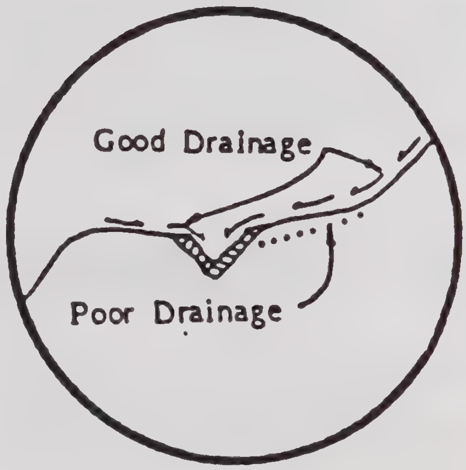
TYPICAL SLOPE SECTION

(Not to Scale)



CONDITIONS:

1. Fill Slope
2. Drainage Terrace
3. Drain Pipe Provided with Positive Outlet on a Paved Surface
4. Downspout
5. Roof Gutter
6. Drainage Swale
7. Weep Holes Thru Retaining Wall
8. Surface Drain
9. Original Ground Surface
10. Retaining Wall
11. Brow Ditch
12. Fill Compacted to Engineering Specifications and Keyed Into Firm Ground
13. Subdrain
14. French Drain
15. Subdrain
16. Cut Slope
17. Curb to Prevent Slope Erosion
18. Lined Drains and/or Ditches



DETAIL

(Not to Scale)

NOTE: Acknowledgement is hereby made to the San Diego Chapter of the California Council of Civil Engineers and Land Surveyors.

FIGURE B-1

GLOBE Soil Engineers

APPENDIX C: GUIDE SPECIFICATIONS SUBSURFACE DRAINS

A. DESCRIPTION

Underdrains consisting of perforated Orangeburg drain pipe, or perforated galvanized corrugated metal pipe shall be installed as shown on the plans and in accordance with these specifications, unless otherwise specified by the Engineer.

B. MANUFACTURE

Underdrains shall be manufactured in accordance with the following requirements:

1) Perforated corrugated metal pipe shall conform to the AASHTO Designation M136.

2) Perforated Orangeburg pipe shall conform to the Federal Specification SS-P-356.

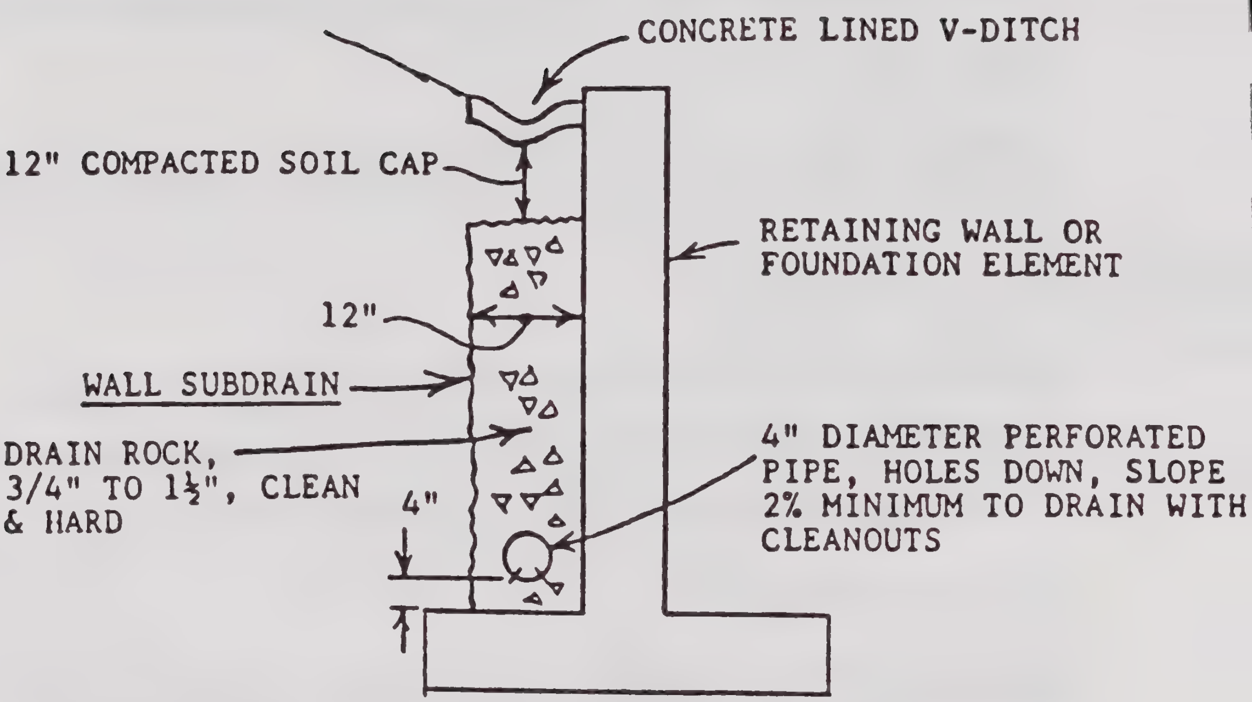
C. FILTER MATERIAL

Filter material for use in backfilling excavations around and over subdrains shall consist of clean coarse sand and gravel or crushed stone conforming to the following grading requirements:

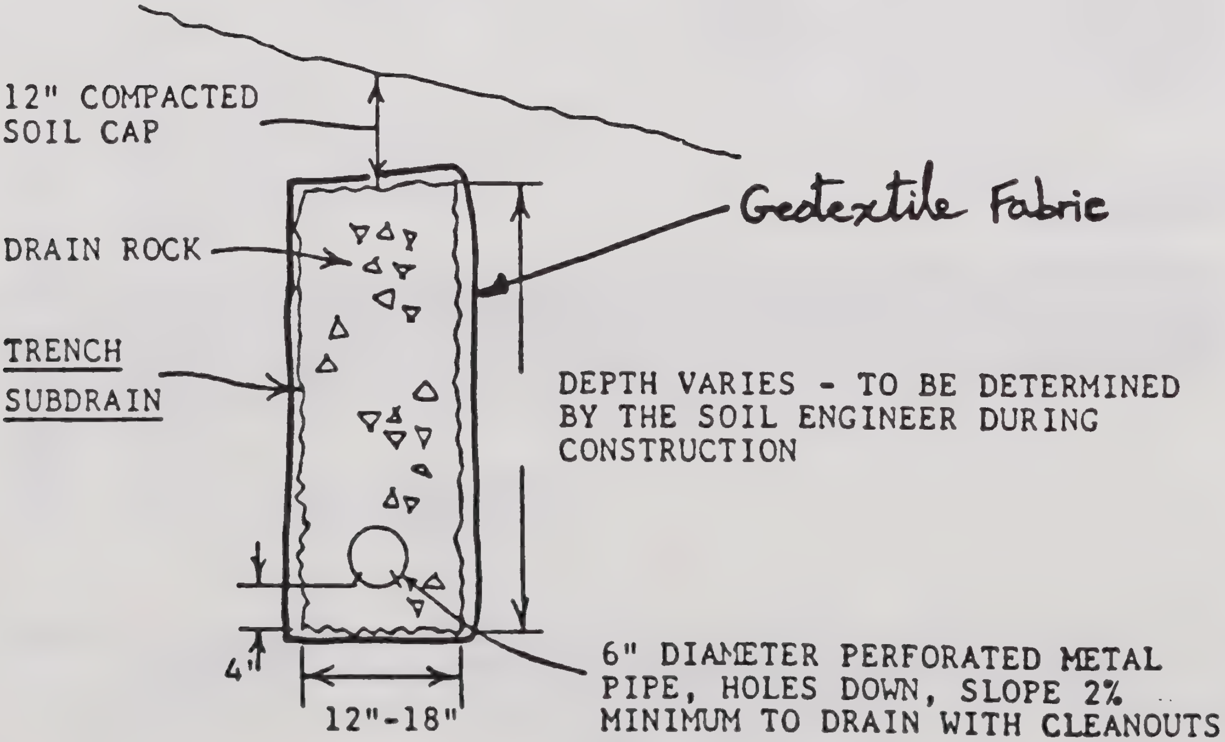
Sieve Size	Percentage Passing Sieves
2 in.	99-100 percent
3/4	70-100
3/8	40-100
No. 4	25-50
No. 8	15-35
No. 30	5-18
No. 50	0-10
No. 200	0- 3

D. PLACING

The walls shall be backfilled with filter material to the elevations shown on the plans, or as directed by the Engineer. It will probably be necessary to place this rock as the rest of the backfill is being placed. The filter rock shall then be covered with a layer of building paper or plastic. The upper portion of the excavation shall then be backfilled with an impervious soil which shall be compacted.

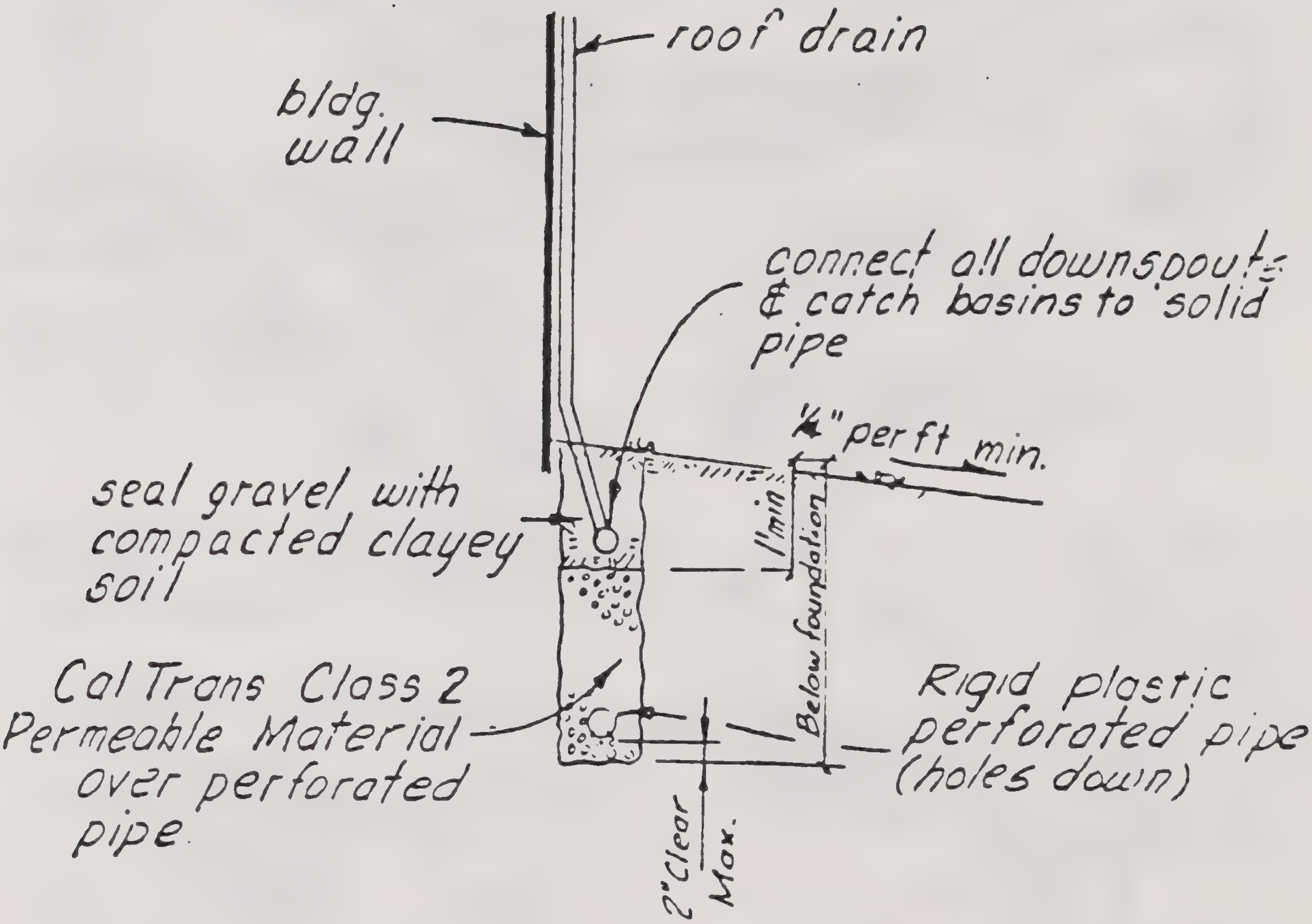


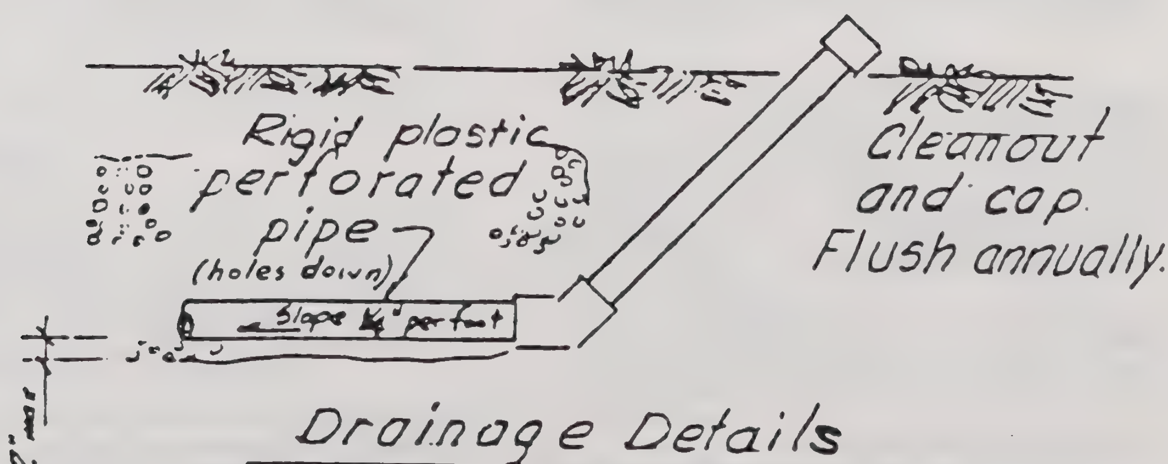
ALL SUBDRAIN & V-DITCH WATERS SHOULD BE COLLECTED IN CLOSED PIPES WITH PERIODIC CLEANOUTS & DISCHARGED INTO THE AREA STORM DRAIN SYSTEM



TYPICAL DRAINAGE DETAILS

GLOBE Soil Engineers



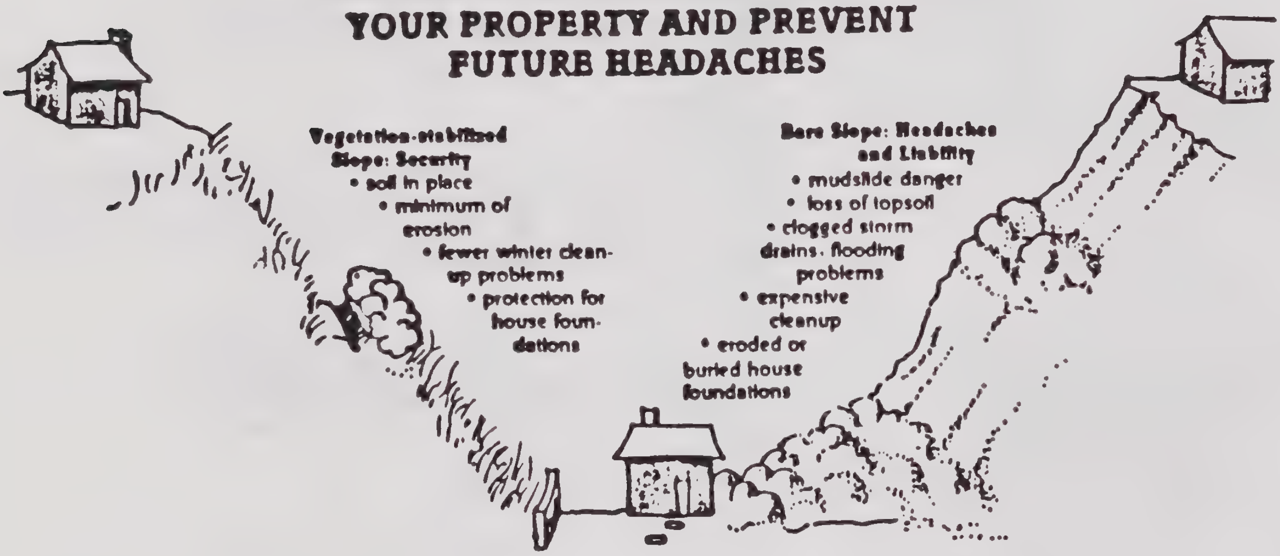


Drainage Details

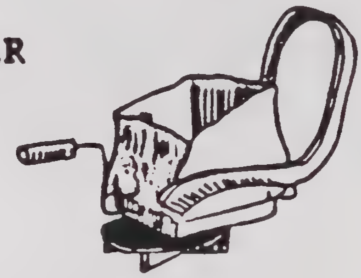
GLOBE Soil Engineers

APPENDIX D: VEGETATION AND EROSION CONTROL *

EROSION CONTROL CAN PROTECT YOUR PROPERTY AND PREVENT FUTURE HEADACHES



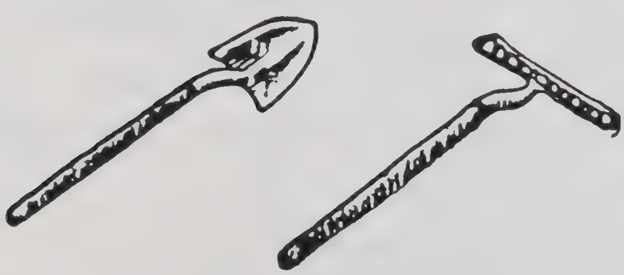
TIPS FOR THE HOMEOWNER



"Winterize" your property by mid-September. Don't wait until spring to put in landscaping. You need **winter protection.** Final landscaping can be done later.

Inexpensive measures installed by fall will give you protection quickly that will last all during the wet season.

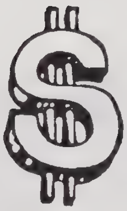
Seeding of bare slopes
- Hand broadcast or use a "breast seeder." A typical yard can be done in less than an hour.
- Give seeds a boost with fertilizer.
- Mulch if you can, with grass clippings and leaves, bark chips or straw.
- Use netting to hold soil and seeds on steep slopes.
- Check with your local nursery for advice.



In one afternoon you can:
- Dig trenches to drain surface runoff water away from problem areas such as steep, bare slopes.
- Prepare bare areas on slopes for seeding by raking the surface to loosen and roughen soil so it will hold seeds.

Winter alert
- Check before storms to see that drains and ditches are not clogged by leaves and rubble.
- Check after major storms to be sure drains are clear and vegetation is holding on slopes. Repair as necessary.
- Spot seed any bare areas.

* From Alameda County Recommendations



WHAT YOU CAN DO TO CONTROL EROSION AND PROTECT YOUR PROPERTY

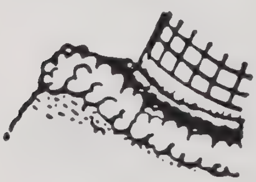
Soil erosion costs Bay Area homeowners millions of dollars a year. We lose valuable topsoil. We have to pay for damage to roads and property. And our tax money has to be spent on cleaning out sediment from storm drains, channels, lakes and the Bay.

You can protect your property and prevent future headaches by following these guidelines:

BEFORE AND DURING CONSTRUCTION

- Plan construction activities during spring and summer, so that erosion control measures can be in place when the rain comes.
- Examine your site carefully before building. Be aware of the slope, drainage patterns and soil types. Proper site design will help you avoid expensive stabilization work.
- Preserve existing vegetation as much as possible. Limit grading and plant removal to the areas under current construction. (Vegetation will naturally curb erosion, improve the appearance and the value of your property, and reduce the cost of landscaping later.)

- Use fencing to protect plants from fill material and traffic. If you have to pave near trees, do so with permeable asphalt or porous paving blocks.
- Preserve the natural contours of the land and disturb the earth as little as possible. Limit the time in which graded areas are exposed.



- Minimize the length and steepness of slopes by benching, terracing, or constructing diversion structures. Landscape benched areas to stabilize the slope and improve its appearance.
- As soon as possible after grading a site, plant vegetation on all areas that are not to be paved or otherwise covered.

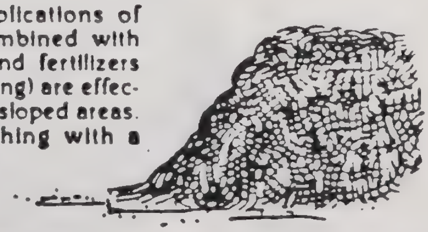
- Control dust on graded areas by sprinkling with water, restricting traffic to certain routes, and paving or graveling access roads and driveways.

TEMPORARY MEASURES TO STABILIZE THE SOIL

Grass provides the cheapest and most effective short-term erosion control. It grows quickly and covers the ground completely. To find the best seed mixtures and plants for your area, check with your local nursery, the U.S. Department of Agriculture Soil Conservation Service, or the University of California Cooperative Extension.

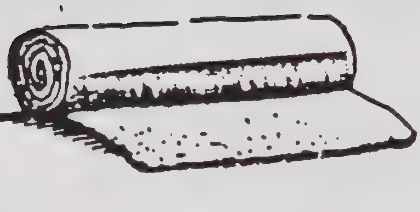
Mulches hold soil moisture and provide ground protection from rain damage. They also provide a favorable environment for starting and growing plants. Easy-to-obtain mulches are grass clippings, leaves, sawdust, bark chips and straw.

Straw mulch is nearly 100% effective when held in place by spraying with an organic glue or wood fiber (tackifiers), by punching it into the soil with a shovel or roller, or by tacking a netting over it.



Commercial applications of wood fibers combined with various seeds and fertilizers (hydraulic mulching) are effective in stabilizing sloped areas. Hydraulic mulching with a tackifier should be done in two separate applications: the first composed of seed fertilizer and half the mulch, the second composed of the remaining mulch and tackifier. Commercial hydraulic mulch applicators — who also provide other erosion control services — are listed under "landscaping" in the phone book.

Page: D3



Mats of excelsior, jute netting and plastic sheets can be effective temporary covers, but they must be in contact with the soil and fastened securely to work effectively.

Roof drainage can be collected in barrels or storage containers or routed into lawns, planter boxes and gardens. Be sure to cover stored water so you don't collect mosquitos, too. Excessive runoff should be directed away from your house. Too much water can damage trees and make foundations unstable.

STRUCTURAL RUNOFF CONTROLS

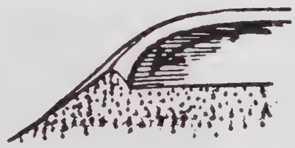
Even with proper timing and planting, you may need to protect disturbed areas from rainfall until the plants have time to establish themselves. Or you may need permanent ways to transport water across your property so that it doesn't cause erosion.

To keep water from carrying soil from your site and dumping it into nearby lots, streets, streams and channels, you need ways to reduce its volume and speed. Some examples of what you might use are:

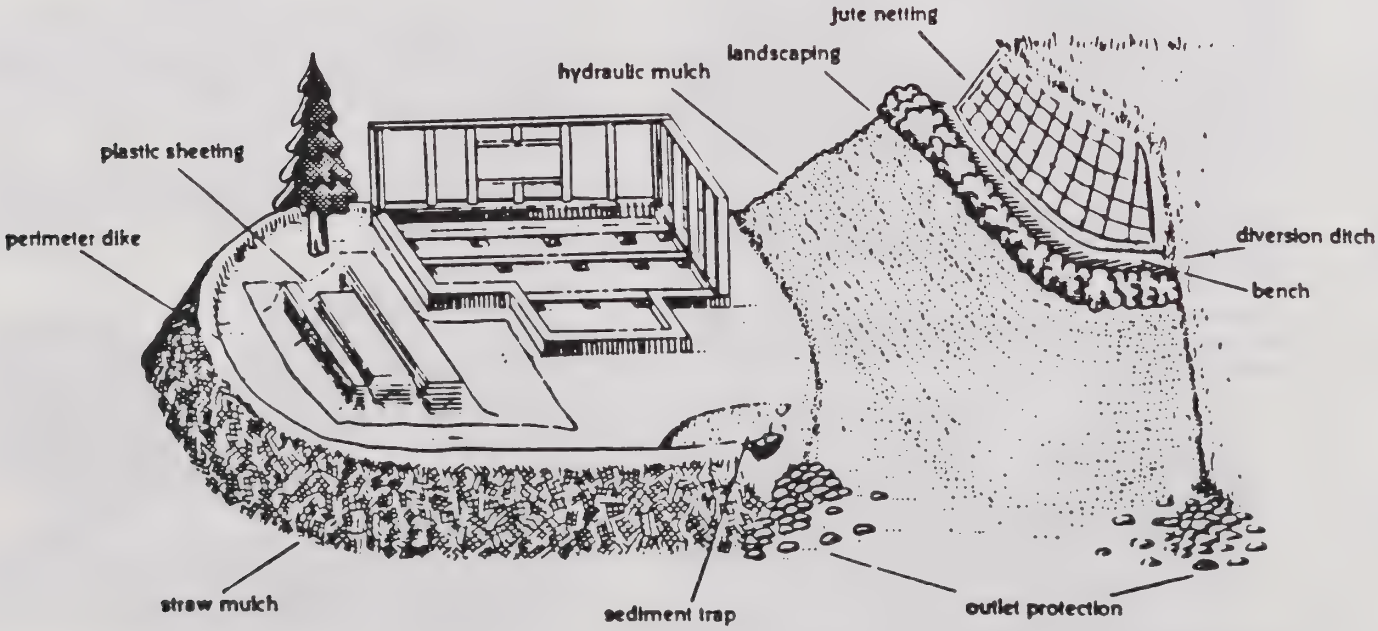
- **Riprap** (rock lining) — to protect channel banks from erosive water flow
- **Sediment trap** — to stop runoff carrying sediment and trap the sediment

- **Storm drain outlet protection** — to reduce the speed of water flowing from a pipe onto open ground or into a natural channel
- **Diversion dike or perimeter dike** — to divert excess water to places where it can be disposed of properly

- **Straw bale dike** — to stop and detain sediment from small unprotected areas (a short-term measure)
- **Perimeter swale** — to divert runoff from a disturbed area or to contain runoff within a disturbed area



- **Grade stabilization structure** — to carry concentrated runoff down a slope



Ref. 23

APPENDIX D: VEGATATION AND EROSION CONTROL
(Taken from Ref. 23, ABAG Manual)

1. TEMPORARY AND PERMANENT PLANTING OF EXPOSED SOILS

STANDARDS

Definition

The planting of fast-growing vegetation, such as grasses, on erodible or eroding areas.

Purpose

Vegetation stabilizes the soil by absorbing the impact of raindrops, reducing velocity of runoff and allowing precipitation to enter the soil. It provides both short- and long-term protection from erosion and should be used in all areas where vegetation has been removed or disturbed due to construction activities. Examples of applicable areas are cuts, fills, spoil heaps, and denuded or gullied areas. Exceptions, requiring special treatment, are swales, permanent waterways and the upslope toes of dikes over which concentrated runoff flows (see Standard and Sample Specifications for Grass Protection of Waterways, Swales and Dikes). Vegetative stabilization is recommended for all sites because it substantially improves the effectiveness of other control measures.

Design Considerations

1. The following should be considered when selecting the plants for seeding exposed areas:

   - erosion control effectiveness--fast growth, complete ground coverage, fibrous root mat;
   - commercial availability;
   - drought tolerance;
   - fire hazard;
   - fertilizer requirements;
   - application and maintenance costs.

2. Several types of plants are available for erosion control. The best are annual grasses because they provide fast establishment, are inexpensive and are widely available. Legumes are an excellent supplement to grass mixes because they fix atmospheric nitrogen, making it available to other plants. Flowers and shrubs generally provide poor erosion control protection, but they are sometimes used on less erodible sites for color and variety. Table 5 rates plants for their erosion control effectiveness in the Bay Area when seeded at the typical rates shown in the table.

3. The plants listed in Table 6 should not be used for erosion control in the Bay Area. They compete with native vegetation and degrade wildlife habitat. They have the propensity to spread rapidly and

TABLE 5. EROSION CONTROL RATINGS OF PLANTS USED IN THE BAY AREA

Plant Species	Height	Erosion Rating First Year	Erosion Rating Following Years	Fuel Volume	Typical Seeding Rates[1] (lbs/ac)	Comments
ANNUAL GRASSES						
Brome, 'Blando'	1-2½'	Exc.	Good	Med.	40-60	Establishes on compact soils better than barley.
Fescue, 'Zorro' annual	10-12"	Exc.	Good	Low	10-20	Best adapted to shallow soils.
Ryegrass, Italian or annual	1-3'	Exc.	Poor	Med.	40-60	Much fertilizer required. Turns gray-black and inhibits reseeding of other species.
Ryegrass, 'Wimmera 62'	1-3'	Exc.	Poor	Med.	40-60	Pros and cons similar to annual ryegrass; matures earlier.
Barley	2-3'	Exc.	Poor	Med.	300	Good for early erosion control, but requires high seeding rate.
Oats	3-4'	Good	Poor	High	300	Requires high seeding rate, blends with range landscape.
PERENNIAL GRASSES						
Fescue, creeping red	1-1½'	Good	Good	Low	15-30	Irrigation required.
Fescue, tall	3-6'	Good	Good	Low	15-30	Irrigation required; widely adaptable, grows very tall unless mowed.
Hardinggrass	3-4'	Fair	Good	Low	10-20	Min. 20" rainfall; bunchy growth can block view.
Orchardgrass, 'Berber' or 'Palestine'	2-4'	Good	Good	Low	15-30	Min. 20" rainfall; compatible with wildflowers. 'Berber' has better winter growth, better adapted than wheatgrass.
Perlagrass ('Perla' koleagrass)	3-4'	Good	Good	Low	10-20	Min. 20" rainfall; bunchy growth can block view.
Ryegrass, perennial	1-3'	Good	Poor	Low	15-30	Cannot tolerate drought; may be useful short-term cover.
Wheatgrass, 'Luna' pubescent	24-40"	Fair	Good	Low	10-40	Best performing wheatgrass variety; plant on fill slopes only.
ANNUAL LEGUMES						
Clover, bur	½-1'	Fair	Good	Low	5-20	Basic soils only.
Clover, crimson	1-2'	Fair	Poor	Low	5-20	Compatible with grasses; has colorful red flowers.
Clover, rose	1-1½'	Fair	Good	Low	5-20	Compatible with grasses; has colorful pink flowers.
Subclover	½-1'	Poor	Fair	Low	3-10	Poor grass competitor; requires grazing or mowing to maintain stand
Vetch, 'Lana' woolypod	1-3'	Good	Fair	High	10-75	Vigorous growth but difficult to mow.
PERENNIAL LEGUMES						
Clover, strawberry	1-2'	Poor	Poor	Low	5-20	Irrigation required; better performance in moist climate.
Trefoil, broadleaf	1-2'	Poor	Poor	Low	5-20	Irrigation preferred; does best in wet areas.
Trefoil, narrowleaf	1-2'	Poor	Poor	Low	5-20	Similar to broadleaf; tolerates slightly drier conditions
FLOWERS						
California poppy	1-2'	Fair	Poor	Low	2-10	CA native with colorful orange flowers; does not persist well with grasses or where heavily fertilized.
Lupine, valley	1-3'	Poor	Poor	Low	5-15	CA native with purple flowers.
Lupine, 'Gedling' Golden	1-3'				1-5	CA native with showy golden flowers.
Lupine, spider	1-3'	Poor	Poor	Low	1-5	CA native with light to deep blue flowers.
Lupine, foothill	1-3'	Poor	Poor	Low	1-5	CA native with purple flowers.
SHRUBS						
Australian saltbush	1'	Fair	Good	Low	6-12	Blue-green colored shrubs; good on fill slopes, competes poorly with grasses.
California buckwheat	1-3'	Poor	Fair	Low	5-10	CA native with brown flowers; competes poorly with grasses.

1. Varies due to number of seeds per pound and germination.

create weed problems on other properties. Use of these species should be restricted to controlled residential and commercial landscaping. Wild oats, an agricultural weed, cannot be legally planted in California.

Table 6. PLANTS NOT RECOMMENDED FOR THE BAY AREA

Algerian ivy	Hedera canariensis
English ivy	Hedera helix
French broom	Cytisus monspessulanus
Pampas grass	Cortaderia jubata
Periwinkle	Vinca major and V. minor
Scotch broom	Cytisus scoparius
Wild oats	Avena fatua

4. Seeds should be planted in time to:

   o germinate with the normally occurring light, early-season rains (0.5 to 1.0-inch storms);

   o establish a root mat capable of resisting the erosive force of a 2.0-inch storm approximately 30 days after germination);

   o germinate and grow while temperatures are mild and daylight is relatively long (before November).

5. Optimum time for planting is before October 1. Planting by October 1 provides a 90% probability that seeds will be in the ground before the first rainfall great enough to cause germination, and a 90% probability that the first erosive rain will not occur for over 30 days.

6. The surface to be seeded should be roughened or broken up so that it can hold seed and permit germination. If a graded area is to be seeded later, it should not be smoothed by grading equipment, but left in a rough or serrated condition. Roughening the soil surface by "track-walking" provides an excellent seedbed and reduces the erosive effects of surface water runoff.

7. The key factor in seeding is to cover the seeds with soil to the proper depth. Other factors to consider are slope, size of area to be seeded and soil depth.

   (a) Handseeding is best on small areas. Breast seeders ("belly-grinders") are inexpensive. Labor effort is 2 to 3 hours per acre.

   (b) A seed drill works best on level areas. It should not be used on slopes greater than 3:1. When seed is drilled, seed requirements may be reduced up to 50%.

(c) Hydroseeding is most efficient for seeding steep slopes and shallow soils (such as cut slopes and slopes steeper than 2:1). "Hydroseeding," as used in this standard, is the simultaneous application of seed, fertilizer and mulch in a slurry.

8. Factors to consider for irrigating a planted area include:

- time of year;
- water availability;
- steepness of slope;
- cost;
- size of area;
- equipment and technique;
- frequency;
- drought tolerance of planted vegetation.

Irrigation is expensive (about $1,000 per acre per month). It is generally not necessary unless the:

- seeded area is particularly critical (such as a steep, erodible slope above a water supply reservoir);
- plant species used are not drought tolerant;
- seeds are planted at the wrong time of year.

Once begun, irrigation should be continued until plant cover is fully established. Ceasing irrigation after germination leaves seedlings vulnerable to destruction by drought. Excessive irrigation or other improper irrigation practices can be harmful.

9. Application of mulch increases percentage of plant establishment and protects a disturbed site from erosive forces. Mulch helps hold fertilizer, seed and topsoil in place in the presence of wind, rain and runoff, and maintains moisture near the soil surface. Commonly used mulches include straw, wood fiber, wood chips or bark, fabric or mats, soil and gravel.

The choice of mulch should be based on:

- effectiveness of materials;
- size of area;
- steepness of slope;
- soil depth and surface hardness;
- wind conditions;
- availability of materials;
- cost;
- access to roadway and slope orientation (uphill or downhill);
- fire hazard;
- weed growth;
- maintenance and repair costs.

Straw is the preferred mulch material:

- on slopes of less than 2:1;
- in large areas accessible within 50 feet of straw-blowing equipment;
- on fill slopes;
- in nonwindy areas;
- in downhill or downwind applications;
- where fire hazard and weed growth are not critical factors;
- where repair and revegetation would be costly (straw mulch is highly effective and should not require maintenance if properly applied).

Wood fiber mulch, applied hydraulically, is the preferred mulch material:

- in areas more than 50 feet from road access;
- on slopes steeper than 2:1;
- on cut slopes with shallow soil cover;
- in windy areas;
- where straw is not available;
- where fire hazard or weed growth are critical factors.

While initial costs of applying wood fiber mulch hydraulically may be lower than costs of applying straw mulch, repair and maintenance requirements are often greater with wood fiber because wood fiber provides less immediate protection than straw.

10. Fertilizer is necessary for rapid growth of grasses or legumes. It is important because construction activities generally result in the exposure of infertile parent material. Ammonium phosphate sulfate, 16-20-0, at the rate of 500 pounds per acre adequately replenishes soil nutrients during the critical first year and allows rapid plant cover establishment.

11. Slopes should be repaired and/or reseeded if the following conditions are observed:

    - sheet or rill erosion;
    - sediment buildup at toe of slope.

    If seeding is done long before September, seed loss caused by birds and wind may be significant. Thus, planting during September may improve results.

Unit Cost Guide

$500-$1,000 per acre (as of fall 1979).

2 TEMPURARY ANU PERMANENT GRASS PRUTECTION UF WATERWAYS, SWALES AND DIKES

STANDARD

Definition

Vegetation lining a natural or constructed waterway, swale or dike to protect it from erosion.

Purpose

Grass protection of drainageways reduces erosion by lowering water velocity over the soil surface and by binding soil particles with roots. A drainageway, as used in this standard, is any ground surface over which concentrated runoff travels. It is typically a manmade waterway, swale or ditch. It may also be the upslope side of a dike or berm, which intercepts overland flow of water and directs the concentrated flow along the surface of the barrier. Grassed drainageways should not be used:

- where the drainageway gradient must be steeper than 10%;
- below high sediment-producing areas unless measures (such as sediment basins) are installed to prevent sediment from reaching the drainageway;
- above slopes where infiltration of water may cause soil slumping or slope failure.

This standard supplements those for Permanent Waterway, Temporary Dike, and Temporary Swale.

Design Considerations

1. The placement of a grassed drainageway must be carefully considered. Its design should be based on a comprehensive evaluation of the surface contours and, for permanent waterways, on estimated peak surface runoff from the design storm. Natural subsurface drainage conditions should be evaluated to determine whether drainage from a grassed drainageway will adversely affect the subsurface drainage system.

2. Water velocity in grassed drainageways will be slower than in concrete or earth-lined drainageways. Therefore, grassed drainageways may need to be larger. If space does not permit the design of a wide or gently sloping channel, then other linings must be used.

3. Outlets should function with a minimum of erosion.

4. Grassed drainageways should be periodically inspected during the rainy season to see that debris is not obstructing the drainage path. Permanent grassed waterways should be seasonally maintained by mowing or irrigating depending on the type of vegetation selected. Grassed swales requiring mowing should be designed to accommodate a minimum bottom width to allow for mowing access.

5. Factors to consider in the selection of plants include:

   - plants tolerant of temporary or seasonally high moisture and waterlogged soil conditions;

   - plants that establish extensive fibrous roots or rhizomes to bind the soil mass and prevent erosion;

   - plants that have low biomass and that do not mat excessively or cause flow to channelize;

   - plants that develop and establish rapidly following the normally occurring light, early-season rains;

   - plants that reseed and develop well from seed or provide continuous vegetative growth.

   Plants that meet these criteria are listed in Table 7.

6. Seeding rates for plants should be sufficiently high to provide a dense grass stand. The seeds should be uniformly distributed to reduce patchy growth effects and soil exposure, especially when seeding bunching or nonspreading grasses.

7. Seeding, mulching, fertilizing and irrigating considerations are the same as those discussed in the Standard for Planting of Exposed Soils. However, hydraulically applied seed and mulch should be used only if grass is established before the rainy season by irrigating.

8. Stabilization of a grassed drainageway should be accomplished before the first erosive rains of the season. Seeding should be completed by September 15 to maximize the chances of intercepting the light, early-season rains and the chances of grass establishment by October 15. A good indicator of stabilization is the absence of exposed soil in the drainageway.

   Germinating rains do not always come before erosive rains. In addition, early season rains are often insufficient to establish adequate grass cover before the period of heavy winter rains (December to February). Therefore, a contingency plan is advised to ensure either grass establishment or another form of drainageway protection. Temporary irrigation measures can be used to establish grass. Measures such as straw mulching at the time of seeding can provide temporary protection until grass is established.

TABLE 7. PLANTS SUITABLE FOR BAY AREA GRASSED WATERWAYS, SWALES AND DIKES

Common Name	Scientific Name	Persistence/ Growth Form	Maintenance Requirements	Comments	Recommended Seeding Rates[a]	Rating[b]	Maximum Permissible Velocity(fps)	%Gradient
Annual ryegrass	Lolium multiflorum	Annual, poor reseeding capacity/ Bunchgrass	-	One year channel protection; common erosion control grass.	50 lbs./acre	***	5 4	0-5 5-10
Barley Oats	Hordeum vulgare Avena sativa	Annual, no reseeding capacity/ Bunchgrass	-	One year channel protection; common erosion control grass.	300 lbs./acre 300 lbs./acre	*	5 4	0-5 5-10
Redtop	Agrostis alba	Perennial/ Sodforming	Summer irrigation	One year channel protection advised; becomes course & stemmy.	15 lbs./acre	***	5	0-5
'Blando' brome	Bromus mollis	Annual, good reseeding capacity/ Bunchgrass	Mowing or heading seasonally	Common erosion control grass.	50 lbs./acre	***	5 4	0-5 5-10
Perennial ryegrass	Lolium perenne	Perennial/ Bunchgrass	Summer irrigation, mowing or heading seasonally	Common turfgrass.	30 lbs./acre	***	5 4	0-5 5-10
Tall fescue	Festuca arudinacea	Perennial/ Bunchgrass	Summer irrigation, mowing or heading seasonally	Common turfgrass; supports machine traffic; may use without other grass species.	500 lbs./acre	****	6 5	0-5 5-10
Orchardgrass	Dactylis glomeris	Perennial/ Bunchgrass	Mowing or heading seasonally	Use with other grasses, otherwise channeling may occur.	20 lbs./acre	*	5	0-5
'Kentucky' bluegrass	Poa pratensis	Perennial/ Sodforming	Summer irrigation, mowing or heading seasonally	Common turfgrass.	20 lbs./acre	***	5	0-5
Reed canarygrass	Phalaria arundinacea	Perennial/ Sodforming	Summer irrigation, mowing or heading seasonally	Tolerates excessive flooding.	20 lbs./acre	***	5 4	0-5 5-10
Bermudagrass	Cynodon dactylon	Perennial/ Sodforming	Requires temporary irrigation until grass is established	Develops slowly from seed; may use without other grass species. Do not use next to lawns; vigorous spreading nature may create a nuisance.	30 bu./acre	****	6 5	0-5 5-10
'Luna' pubescent wheatgrass	Agropyron tricophorum	Perennial/ Sodforming	Mowing or heading seasonally		40 lbs./acre	***	5 4	0-5 5-10

a. Recommended seeding rates for mixtures of two or more grasses.
b. Drainageway protection capacity ratings are as follows: Fair = *; Good = **; Excellent = ***; Superior = ****

Specialized erosion control liners can be installed at the time of seeding or as part of a contingency plan to be implemented if grass is not established by October 15. However, these liners vary in cost and effectiveness and should only be used within the manufacturer's limits.

If the area downstream from the drainageway is a critical area or warrants increased protection, the grass should be established in the drainageway by artificial means before the rainy season begins (before October 1).

Unit Cost Guide

Grass establishment: $1.00 - $1.50 per square yard

Sources and References

This standard was prepared by ABAG based on the following sources:

1. Kay, Burgess L., Wildland Seeding Specialist, Department of Agronomy and Range Science, University of California, Davis.

2. U.S. Department of Agriculture, Soil Conservation Service.

3. U.S. Department of Commerce, National Weather Service.

APPENDIX E

ADDENDUM SOIL REPORT
SLOPE STABILITY ANALYSIS

ADDENDUM SOIL REPORT
SLOPE STABILITY ANALYSIS

PROJECT LOCATION:

Redwood Creek Village
25 Acre Subdivision
Balmoral Drive, Oakland
Unincorporated Area of Alameda County, California

January 22, 1992

PREPARED FOR:

Mr. Michael Boyle
12240 Blythen Way
Oakland, CA 94619

GLOBE SOIL ENGINEERS

(Serving the Greater Bay Area Since 1976)

San Francisco Oakland Walnut Creek Pinole San Jose

41 SUTTER STREET, SUITE 1509, SAN FRANCISCO, CA 94104
6580 LONGWALK DRIVE, OAKLAND, CA 94611
PHONE: (510) 482-2276 or 1 (800) 344-SOIL, FAX: (510) 482-9101

January 22, 1992

Mr. Michael Boyle
12240 Blythen Way
Oakland, CA 94619

OUR PROJECT NO.: SR911205
PROJECT LOCATION:
Redwood Creek Village
25 Acre Subdivision, Balmoral Drive
Oakland, Alameda County, California

Dear Mr. Boyle:

In accordance with your request, we are pleased to submit this addendum report of our geotechnical slope stability analysis for your proposed development of the above site. This report is an addendum to our initial report, dated December 14, 1990, and presents the results of our investigation and gives recommendations for maximum allowable temporary slope angles.

We would like to mention that our initial report did cover the entire 25 acre area. However, we did not include geotechnical slope stability analyses in it since we did not feel that it was needed. In this report we have selected the worst case site (Figure 1) from a geotechnical standpoint and performed slope stability analyses on it.

SLOPE STABILTY ANALYSIS

Approximate slope stability analyses were performed based on the geotechnical test data provided in our initial soil report. Four different slide mechanisms were considered, namely Falls Slides, Rotational Slides, Translational Slides, and Flow Slides, as shown in the attached Appendix A. Our analysis indicate that resistance forces such as friction, cohesion, passive pressures and vegetation are sufficient to prevent earth slides along the hypothetical surfaces indicated below, with an adequate margin of safety.

Three different methods of slope stability analysis were investigated. In the first method, we used the conventional soil-mechanics approach, which assumes a circular sliding surface. The second method uses a kinematics approach, where individual rock blocks or wedges are examined in stereographic projections. Finally, in the third method we used the finite element method, which is the most versatile method for the analysis of continuums with arbitrary shapes and loading conditions. In this method, the maximum calculated stresses were compared to various minimum allowable strengths based on our testing program. Once the finite element model was set, it was an easy matter to perform parametric studies where material properties (such as the density or the cohesion) and loading conditions (gravity, seismic, and their combinations) were varied.

Our slope stability analyses indicated that the soil and bedrock layers will possess adequate factors of safety against sliding and flowing, if our recommendations are adhered to. The lowest factors of safety calculated for the various layers are summarized below:

SLIDE PLANE THROUGH	SAFETY FACTOR GRAVITY ONLY	SAFETY FACTOR GRAVITY+SEISMIC
Top soil (6' depth)	2.9	1.8
Weathered bedrock (9' depth)	5.6	3.9
Massive bedrock (16' depth)	12.3	8.8

The property appears to be in a stable condition now, with bedrock exposed at a few locations and the soils well vegetated with brush and small trees. We found no evidence to indicate that slides or flows are actively occuring on the site now, or that such slope processes will preclude development of the proposed homes. However, we recommend that roof drains, surface drainage facilities, and subdrainage facilities discharge from solid pipes into suitable discharge facilities. If drainage is properly controlled and the surface vegetation is well maintained, then we believe that the soils and the slope will not be adversely affected by the proposed development under static or seismic conditions. Finally, given the topography of the area and the bedrock characteristics, we judge that the risk of future deep-seated movement within bedrock is very low, provided that all the recommendations as described in subsequent sections of this report are followed.

TEMPORARY SLOPES

From a soil and geotechnical engineering (slope stability) standpoint, it is expected that steep temporary slopes will remain stable, specially in the bedrock layers, during grading operations. However, it is recommended that the following maximum slopes be used during grading operations:

All temporary cut slopes should not exceed 0.7 horizontal to 1 vertical.
All temporary fill slopes should not exceed 1.5 horizantal to 1 vertical.

Any slopes steeper than the above should be shored.

VEGETATION AND EROSION CONTROL

Site clearing should be performed only where the actual structure will be located, and outside of the actual structure building area we recommend that all of the existing site vegetation be left in its natural condition or increased. We strongly recommend against any general site clearing as such general site clearing could result in barren areas that could result in top soil cracking and erosion.

We recommend that prudent erosion control measures be taken during and after construction, including replanting and vegetation restoration of all barren and disturbed areas after construction. In the interim period between planting and vegetation growth re-establishment, straw and/or jute slope protection matting and/or staked redwood boards should be used as appropriate to help limit erosion.

At the conclusion of the site construction, all fresh, barren and disturbed areas should be adequately seeded and planted with a variety of erosion-resistant grasses and vegetation and growth established and maintained prior to the start of the heavy winter rains. All disturbed ground surfaces should be protected from erosion by spraying a hydromulch with a tackifier on the slopes prior to the onset of winter rains. On slopes steeper than 3 to 1, we recommend the use of a slope protection fabric such as North American Green SC-150. Also, numerous shrubs and trees should be planted for longer range protection. Such long-range landscape efforts should include numerous drought-tolerant, low-water, deep-rooted, fast-growing plants as well as shrubs and trees. We recommend landscape installation of plants that require minimum watering. Native trees may be encouraged to grow on the property in order to knit and reinforce the surface soil together with roots. However, do not plant shallow-rooted trees so close to structures or pavements that root heave can occur. Use of automatic sprinkler systems is not recommended.

CONSTRUCTION SEASON

We recommend that site development and foundation construction and related work be performed during the dry season of the year (April 15 to October 15). If the work is performed during the winter rainy season, then the owner must accept the presence of higher earth hazard risks and probable greater construction costs.

CONCLUSIONS AND RECOMMENDATIONS

Based on our field and office studies, it is our opinion that from a soil and foundation engineering standpoint, the site is suitable for the proposed development, provided that the recommendations presented in our reports are incorporated into the design and construction of the proposed structures, garages and access driveways. The potential for landsliding, liquefaction or subsidence of the native soils on the portion of the site to be developed is judged to be very low if the recommendations of this report are followed.

It is expected that since the site is gently sloping, only a small amount of grading will have to be performed. Also, since the overlying soil layer is very thin (about 1 to 2 feet), the majority of the excavated materials will be bedrock which should not pose any significant hazards to increased erosion and sedimentation. However, our recommendations given in our reports should be followed in order to mitigate any possible erosion.

Detailed geotechnical and foundation engineering recommendations for use in the design and construction of the proposed structures, garages and access driveways were presented in our initial report. It is important that our firm be contacted to:

(1) prepare a Phase 2 report seperately for each site during the design process,
(2) review the geotechnical engineering aspects of the final foundation, grading and drainage plans for each house prior to construction,
(3) continuously observe the general trenching and drilling operations,
(4) continuously observe and test the placement of any structural fill and backfill materials,
(5) continuously observe the installation of subsurface drains behind the retaining walls and in drainage trenches,
(6) observe the surface drainage facilities installed for the development, and
(7) observe the planting of fast-growing, low-water, deep-rooted, erosion-resistant vegetation.

We also recommend that the foundation design and construction be performed by an engineer and a contractor, respectively, who have ample experience with hillside foundations.

Sincerely Yours,
Z. Aldine, Ph.D.
Supervising Engineer
California Soil (Geotechnical) Engineering License # 644
Exp. 3/31/94

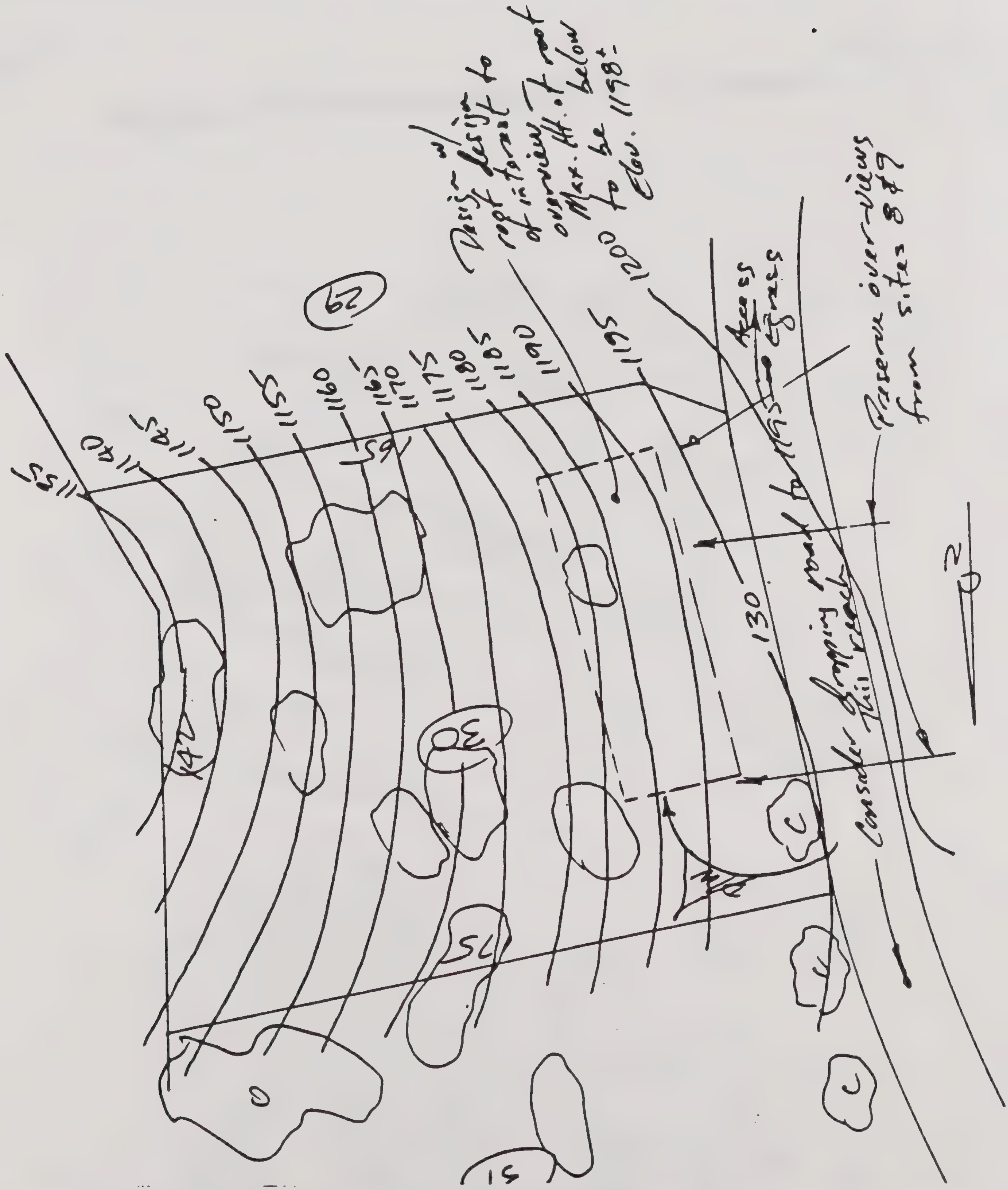
ATTACHMENTS:

FIGURE 1: PORTION OF SITE PLAN

APPENDIX A: HILLSIDE SLOPE STABILITY ANALYSES A1-A15

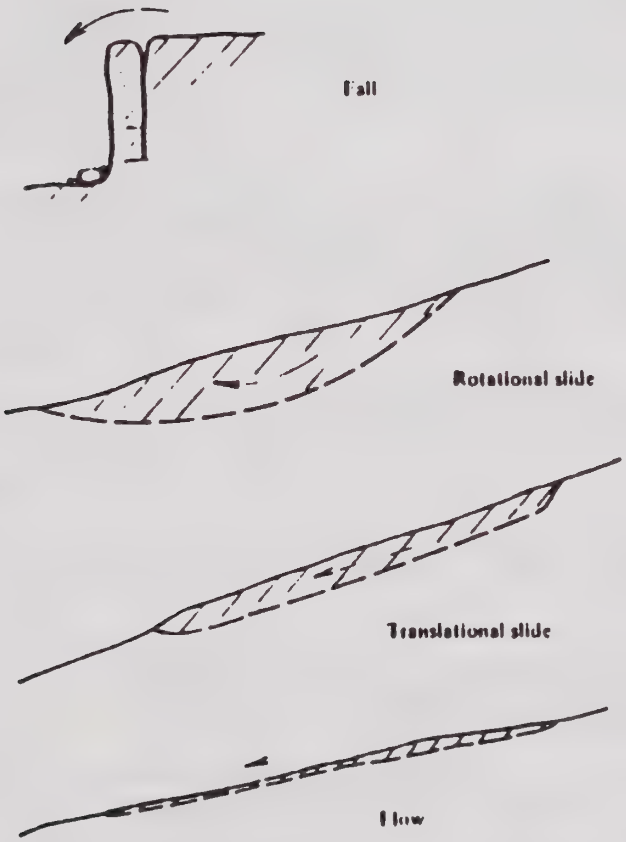
REGISTERED PROFESSIONAL ENGINEER
ZUHAYR NIZAM-ALDINE
No. GE000644
Exp. 3/31/94
GEOTECHNICAL
STATE OF CALIFORNIA

Z. Al

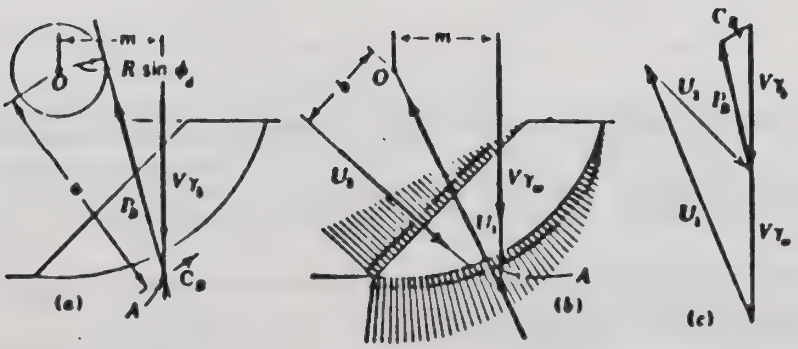


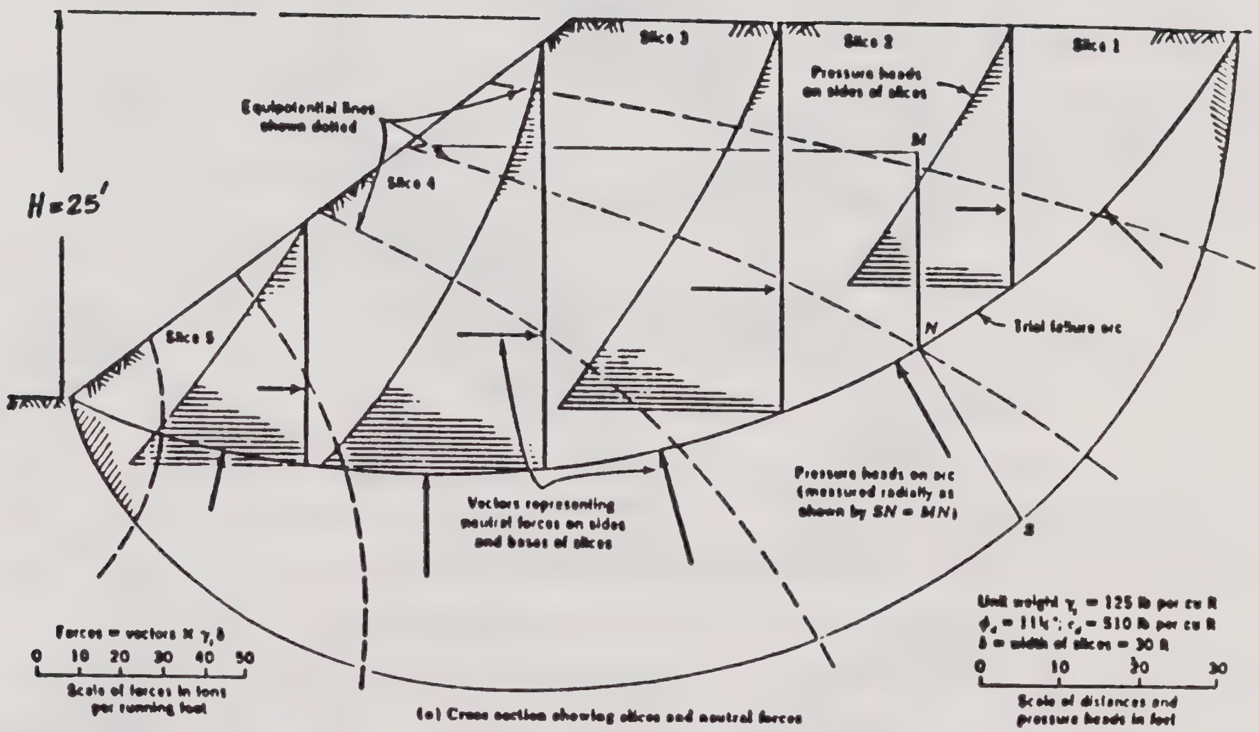
GLOBE SOIL ENGINEERS	PROJECT NO: 911205
	LOCATION: REDWOOD CREEK VILLAGE OAKLAND, CALIFORNIA
WORST CASE SITE	DATE: 1/22/92
	FIGURE: 1

APPENDIX A: HILLSIDE SLOPE STABILITY ANALYSIS



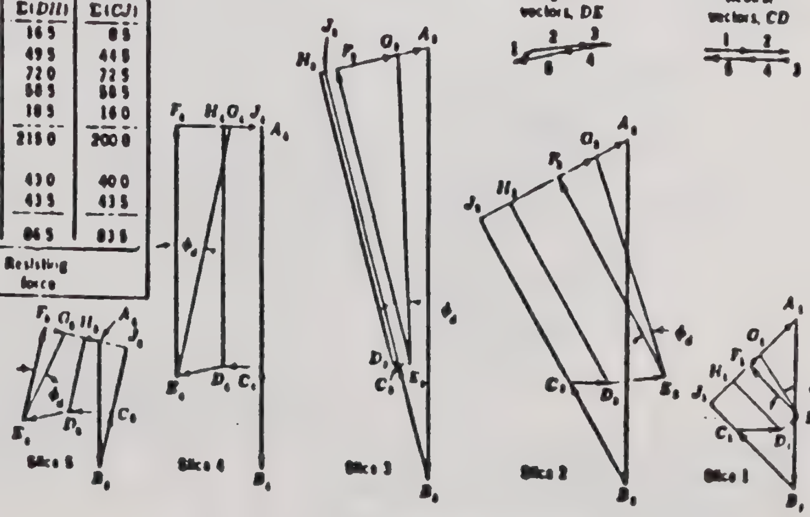
Main slide types.





(a) Cross section showing slices and neutral forces

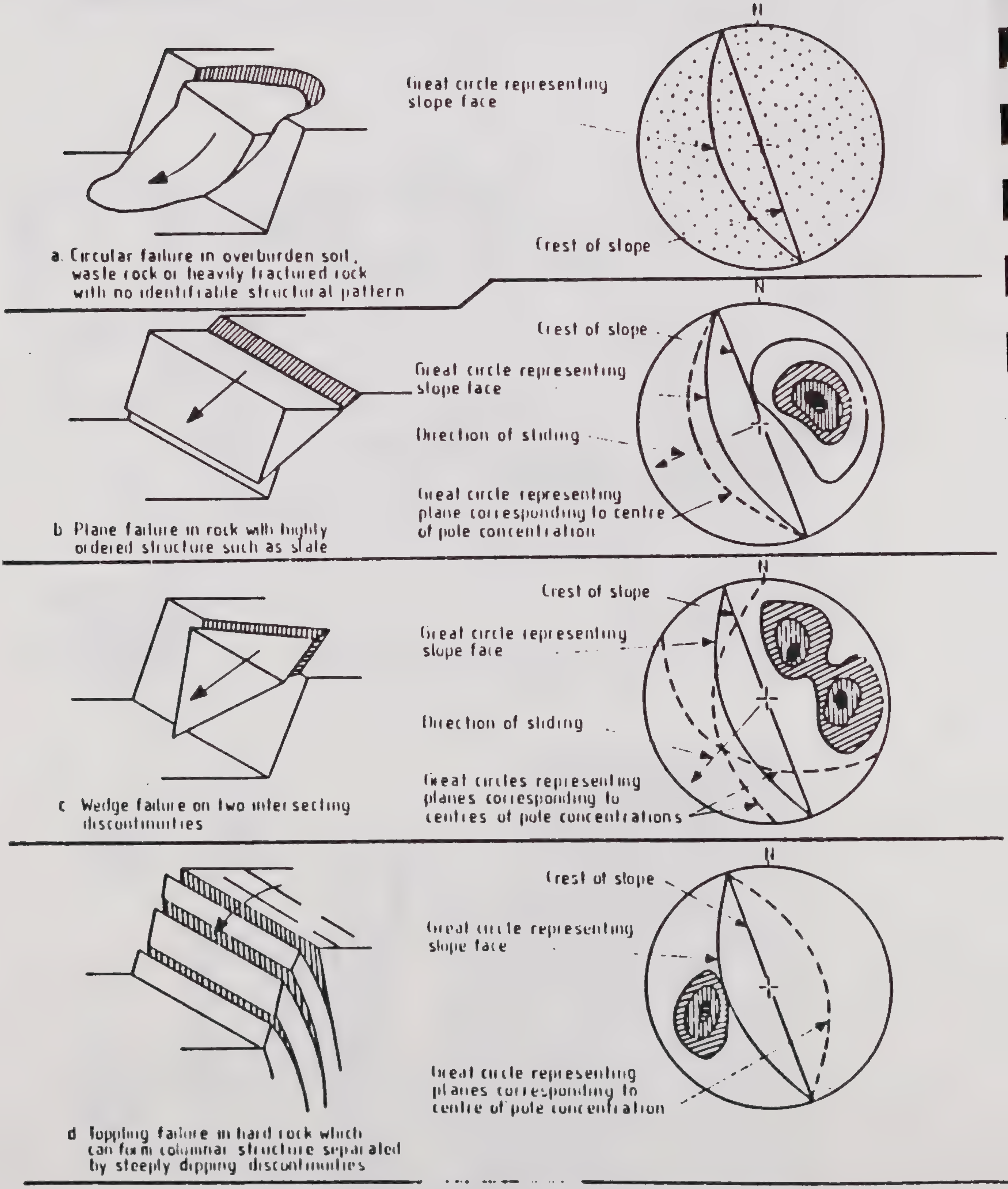
Slice	Forces in Tons per Running Foot			
	ΣW_0	ΣP_R by three procedures		
	$= \Sigma(AJ)$	$\Sigma(EF)$	$\Sigma(DH)$	$\Sigma(CJ)$
1	29.0	17.5	16.5	8.5
2	41.0	54.5	49.5	44.5
3	26.0	73.0	72.0	72.5
4	0.0	60.5	58.5	58.5
5	−7.0	23.5	18.5	16.0
Σ	89.0	229.0	215.0	200.0
$\tan\phi_d\,\Sigma P_R$		45.5	43.0	40.0
$c_d L_a$		43.5	43.5	43.5
	89.0	89.0	86.5	83.5
	Actuating force	Resisting force		



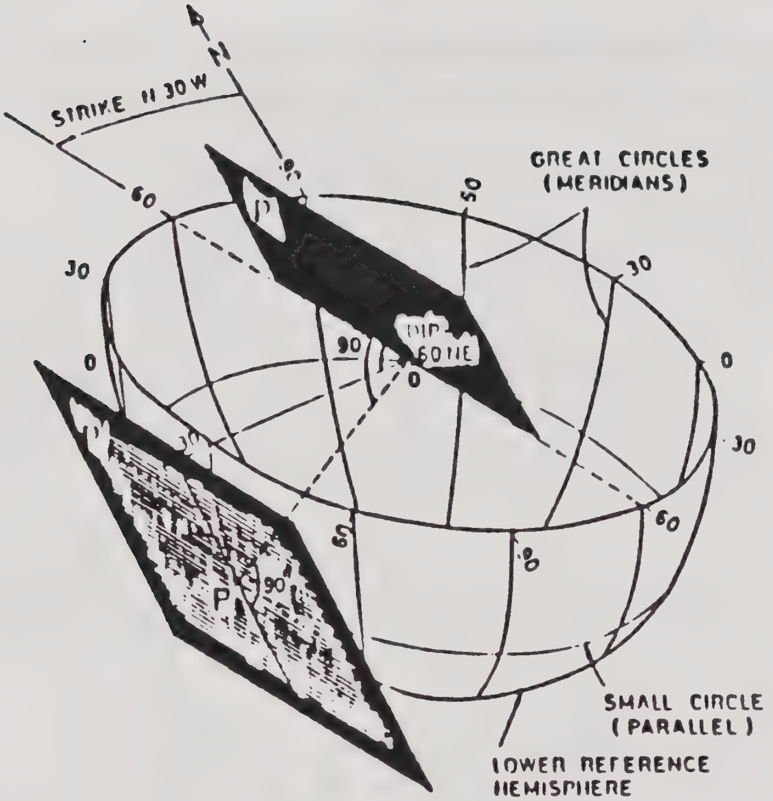
(b) Vector polygons

Stability analysis by the slices method.

Page: A-3

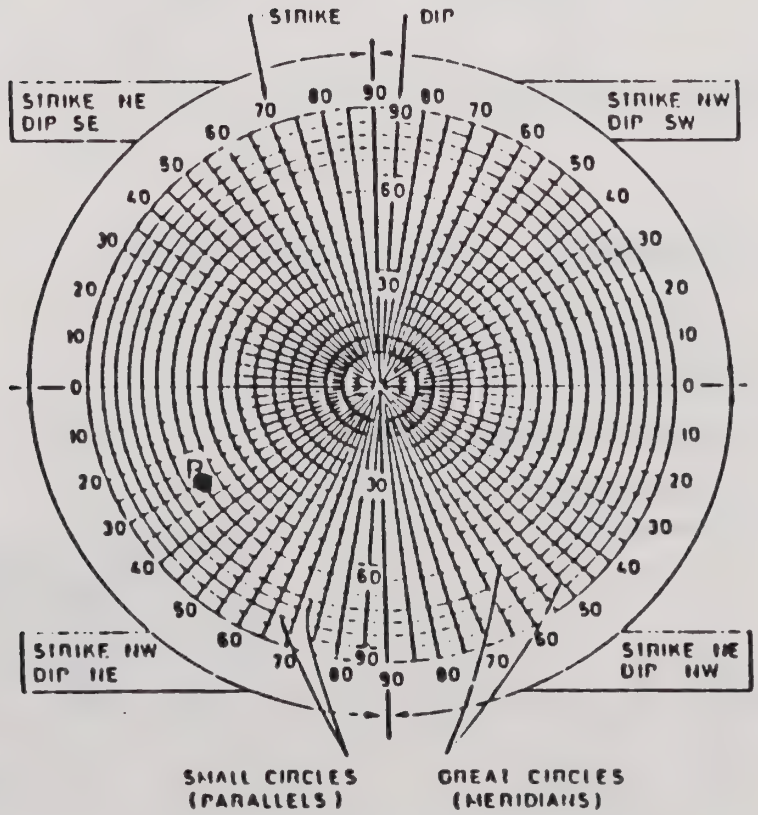


Main types of slope failure related to stereoplots of their discontinuities



PLANE p REPRESENTED BY POLE P, WITH
PLANE p' PARALLEL TO PLANE p.

Pictorial view to explain joint representation



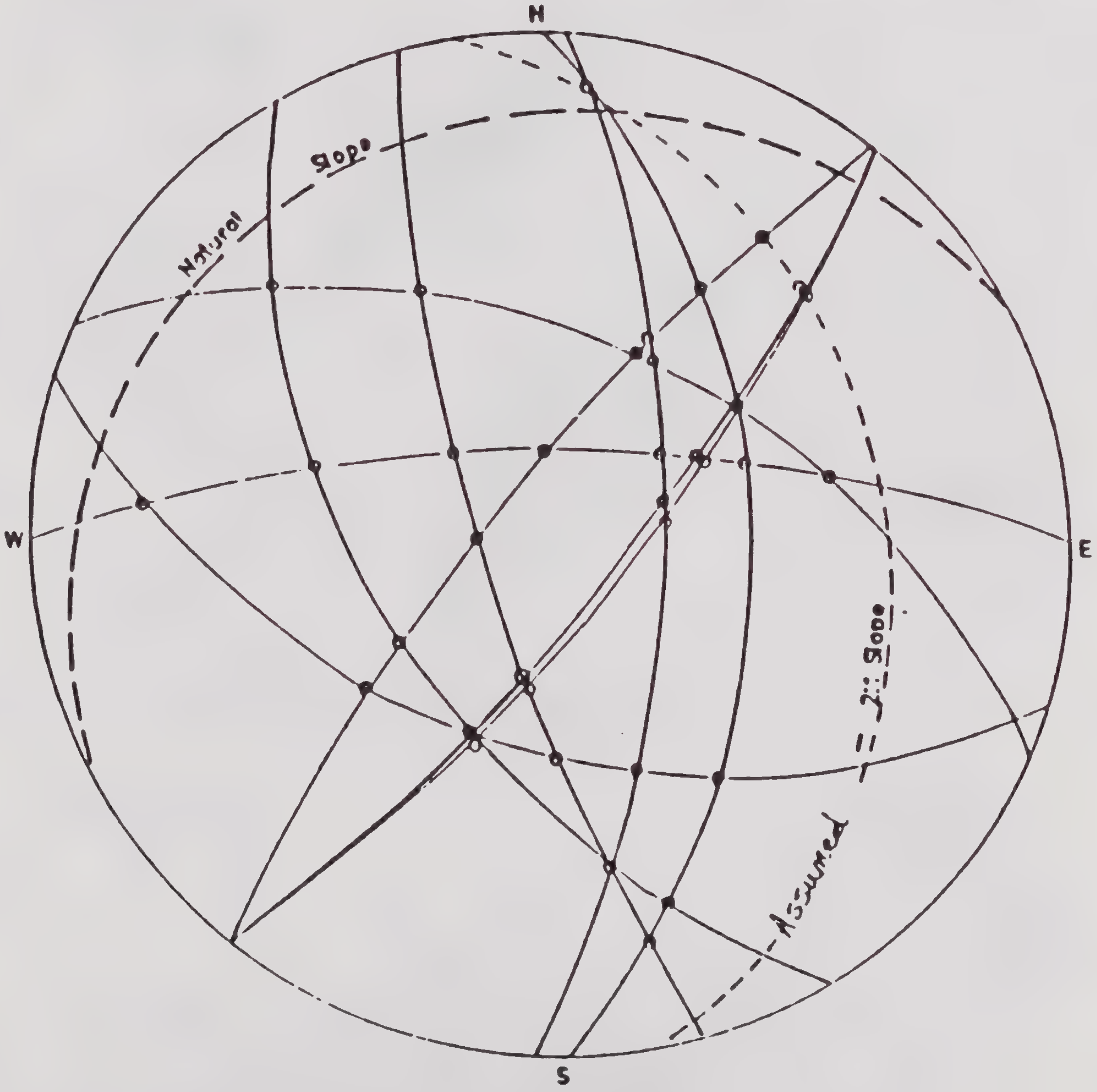
POLE P REPRESENTING PLANE p WITH
ORIENTATION N 30 W, 60 NE

Point represented on an equal-area diagram

STEREOGRAPHIC ANALYSES

Page: A-5

Measured structural orientations of bedding, joints, and fractures were plotted on the lower hemisphere of an equal area stereographic projection to evaluate cut slope stability (Schmidt Net)



(Test Pit #2)

EXPLANATION

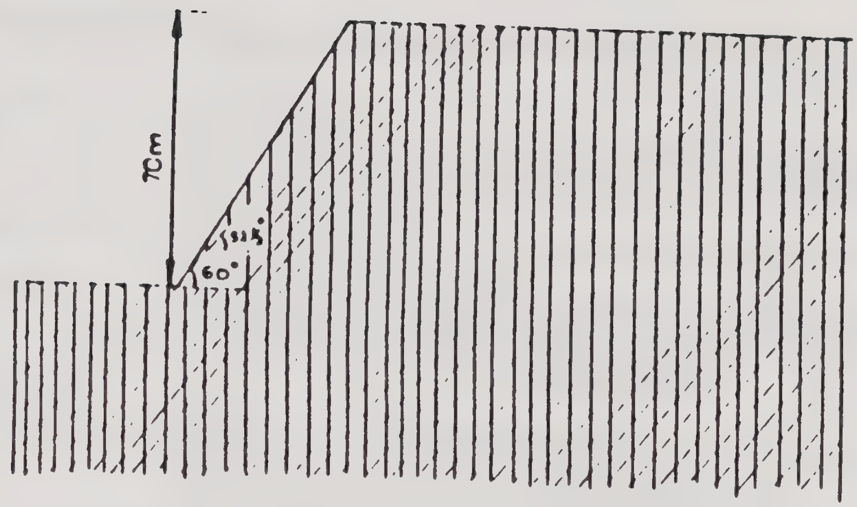
o Intersection of joints, fractures, and bedding representing potential wedge failure orientations

---- Assumed Plane

—— Existing bedding

— — Natural slope

LOWER HEMISPHERE PLOTS OF STRUCTURAL ATTITUDES			
Drn: CH	Chkd.	Project: 87107	
Scale: None		Page C-5	



Assumed parameters :-

$E = 2.8 \times 10^{7}$ kN/m^{2}

$\mu = 0.20$

$K_0 = 1/3$

Density of rock - (ρ) = 2.5 Mg/m^{3}

On both joint sets -

ϕ = 45°

C = variable

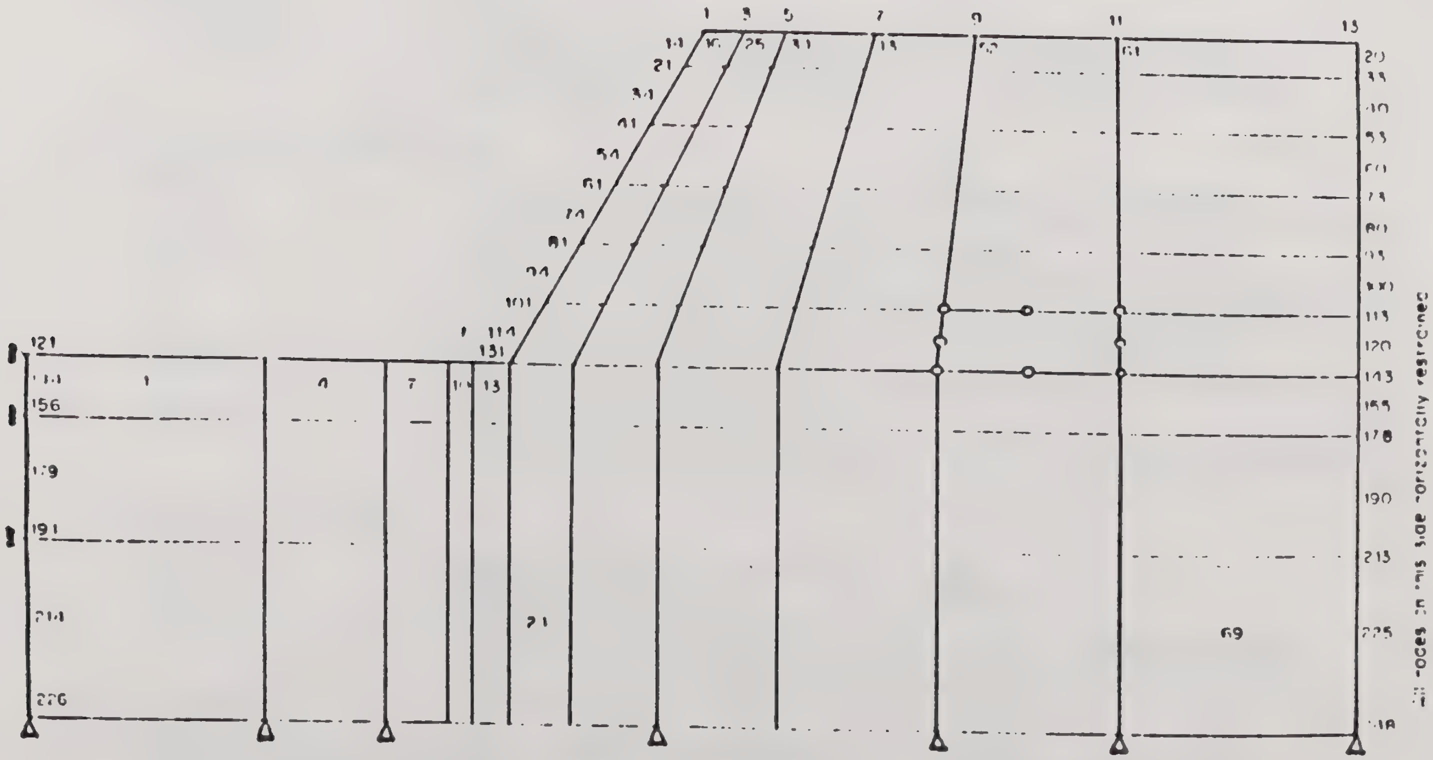
Tensile strength of joint = $C/10$

For intact rock

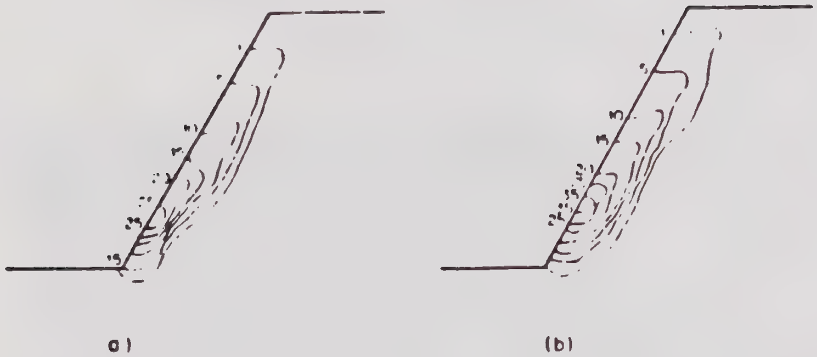
ϕ = 45°

C = 5600 kN/m^{2}

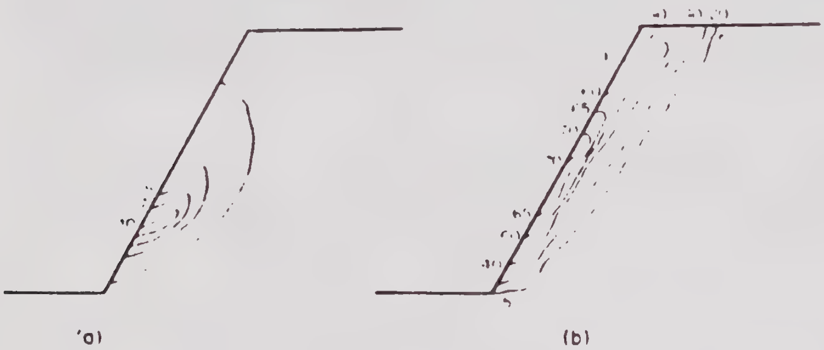
Details of rock slope problem



Finite element idealization 69 isoparametric parabolic elements, 248 nodes, 447 degrees of fredom

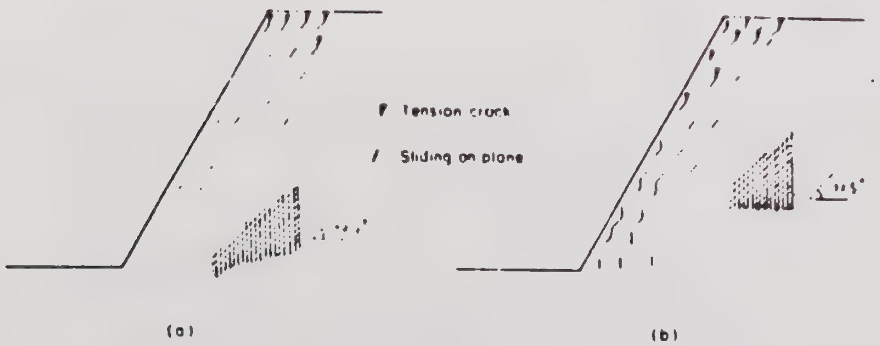


Effective shear strain contours—associative flow rule (a) Converged solution ($C_1 = C_2 = 23$ kN/m², $\phi_1 = \phi_2 = 45$). (b) at collapse ($C_1 = C_2 = 21$ kN/m², $\phi_1 = \phi_2 = 45$) ≈ 500 lb/ft²

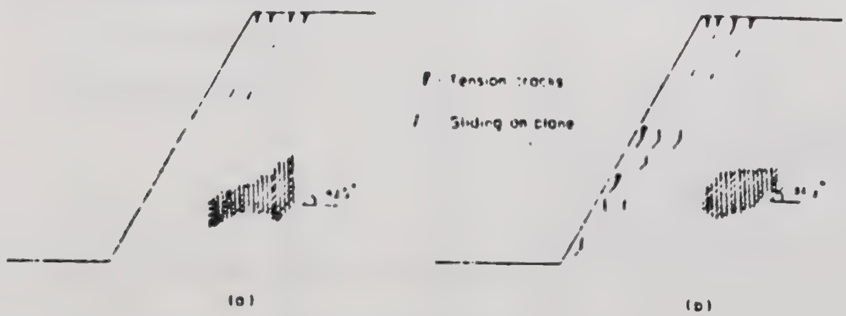


Effective shear strain contour—nonassociative flow rule ($\psi = 0$, no dilatation) (a) Converged solution ($C_1 = C_2 = 25$ kN/m², $\phi_1 = \phi_2 = 45$). (b) at collapse ($C_1 = C_2 = 23$ kN/m², $\phi_1 = \phi_2 = 45$)

≈ .23 tsf



Gauss points still creeping—nonassociative flow rule (a) After 450 time steps. (b) after 1000 time steps



Gauss points still creeping—nonassociative flow rule (a) After 450 time steps. (b) after 1000 time steps

ENGINEERING PROPERTIES OF INTACT ROCK ELEMENTS

1. HARDNESS

Very hard	Cannot be scratched with knife blade; leaves a metallic streak.
Hard	Can be scratched with difficulty; scratch produces little powder and is often faintly visible.
Moderately hard	Can be readily scratched by a knife blade; scratch leaves a heavy trace of dust and is readily visible.
Low hardness	Can be gouged deeply or carved easily with a knife blade.
Soft	Reserved for plastic material alone.

2. STRENGTH

Very strong	Specimen will resist heavy ringing hammer blows and will yield with difficulty only dust and small flying fragments.
Strong	Specimen will withstand a few heavy ringing hammer blows and will yield with difficulty only dust and small flying fragments.
Moderately strong	Specimen will withstand a few heavy hammer blows before breaking.
Weak	Specimen of such material will crumble under light hammer blows.
Friable	Crumbles easily by rubbing with fingers.
Plastic	Very low strength.

3. GRAIN SIZE

Conglomerate	> 2 mm.
Sandstone	.02 to 2 mm.
Siltstone	.002 to 0.02 mm.
Shale	< 0.002 mm.

4. CEMENTATION

Strong	Well cemented and bonded, no voids (favorable).
Moderate	Partially cemented, partially soluble cement.
weak	Poorly cemented, soluble cement, weak bond, with voids.

5. FABRIC

Isotropic	Homogeneous, grains have random orientation (favorable).
Anisotropic	Fabric has planar or linear elements from cleavage or foliations (unfavorable)

6. WEATHERING

Fresh	Unaffected by weathering agents. No disintegration or discoloration. Fractures usually less numerous than joints.
Little	No megascopic decomposition of minerals; little or no effect on normal cementation. Slight and intermittent, or localized discoloration. Few stains on fracture surfaces.
Moderate	Slight change or partial decomposition of minerals, little disintegration; cementation little to unaffected.
Deep	Moderate to complete mineral decomposition, extensive disintegration, deep and thorough discoloration.

7. GROUNDWATER

Dry	No water problems (favorable).
Moist	Moderate water pressure.
Wet	Water problems. High pore pressure reduces the effective normal stress. Water acts as lubricant and reduces frictional shear strength. Water increases the rate of rock decomposition.

8. COLOR

Color helps determine the geologic composition of the rock and indicates whether iron oxidation or water damage has taken place.

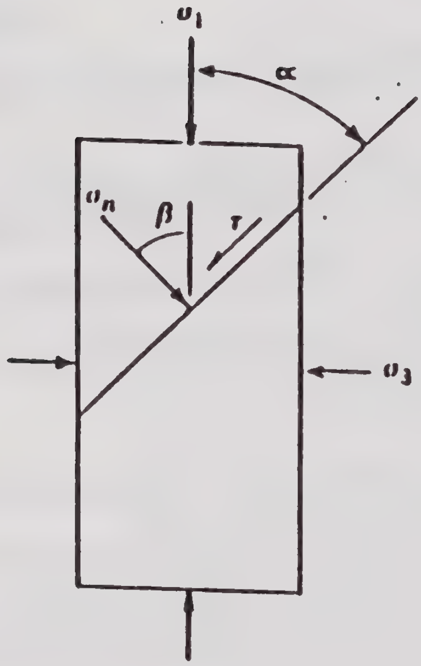


Figure B-1 Development of shear failure surface under axial compression. α is the angle between the applied axial stress and the shear failure plane.

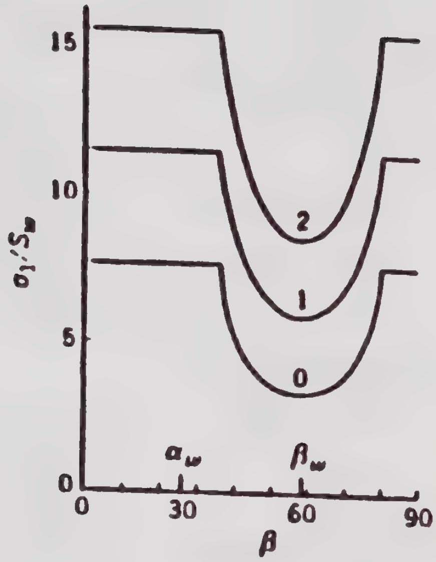


Figure B-2. Influence of planar anisotropy on axial strength σ_1 for samples with normals to planes of weakness oriented at angle β_w from σ_1, where S_w is shear strength of planes of weakness. Numbers on curves indicate tests at different confining stresses.

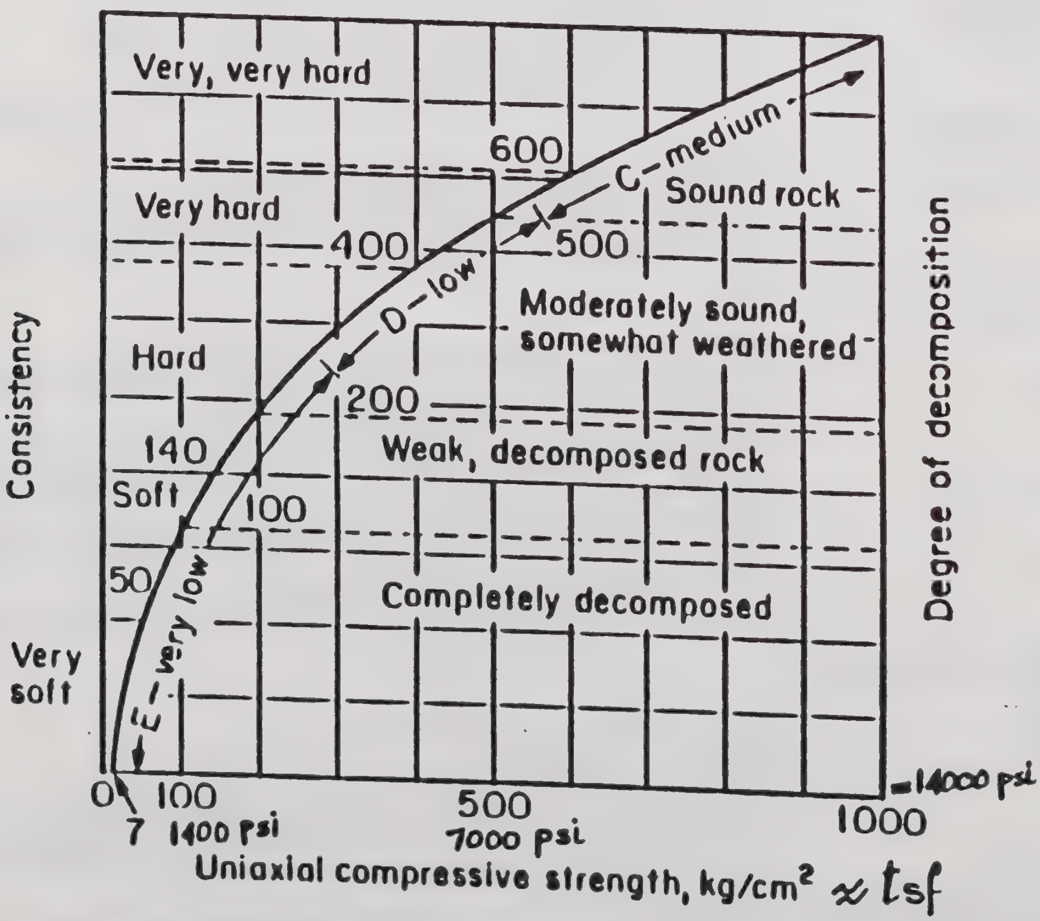


Figure B-3. Rock classification based on uniaxial compressive strength as given by various investigators

ENGINEERING PROPERTIES OF JOINTS

1. JOINT SURFACE SHAPE (WAVINESS, UNDULATIONS)

Very Wavy	Large and numerous waves and undulation (favorable).
Wavy	Few waves and irregularities, average joints interlock.
Planar	Weak interlock (unfavorable).

2. JOINT SURFACE ROUGHINESS (ASPERITIES)

Very Rough	Dense and high asperities, high friction angle (favorable).
Rough	Moderate friction.
Smooth	Low asperities and friction angle (unfavorable).

3. JOINT SURFACE SEPERATIONS (GAP THICKNESS)

Narrow	< 1 mm and smaller than height of asperities (Favorable).
Medium	1-5 mm or smaller than height of asperities.
Large	> 5 mm or larger than height of asperities (unfavorable).

4. THICKNESS OF FILL MATERIAL

Thin	< 1mm and thinner than height of asperities (favorable).
Medium	1-5 mm, but thinner than height of asperities.
Thick	> 5mm or thicker than heigh of asperities (unfavorable).

5. NATURE OF FILL MATERIAL

Strong	Fully bonded with a strong cement such as calcite, quartz or epidote.
Moderate	Partially cemented, partially soluble cement.
weak	Poorly cemented, soluble cement, weak bond, with voids. Weak filling such as clay, mica, chlorite, graphite or talc.

6. JOINT SURFACE WEATHERING

Fresh	Unaffected by weathering agents. No disintegration or discoloration (favorable).
Little	No megascopic decomposition of minerals; little or no effect on normal cementation.
Moderate	Slight change or partial decomposition of minerals, little disintegration; cementation little to unaffected.
Deep	Moderate to complete mineral decomposition, extensive disintegration, deep and thorough discoloration.

7. WATER IN JOINT

Dry	No water problems (favorable).
Moist	Moderate water pressure.
Wet	Water problems. High pore pressure which reduces the effective normal stress. Water acts as lubricant and reduces frictional shear strength. Water also increases the rate of rock decomposition.

8. COLOR

Color helps determine the geologic composition of the rock and indicates whether iron oxidation or water damage has taken place.

Figure B-4. Irregularities on a discontinuity. A - first order and B - second order, where β - average slope angle; i - angle between surface feature and average dip of discontinuity

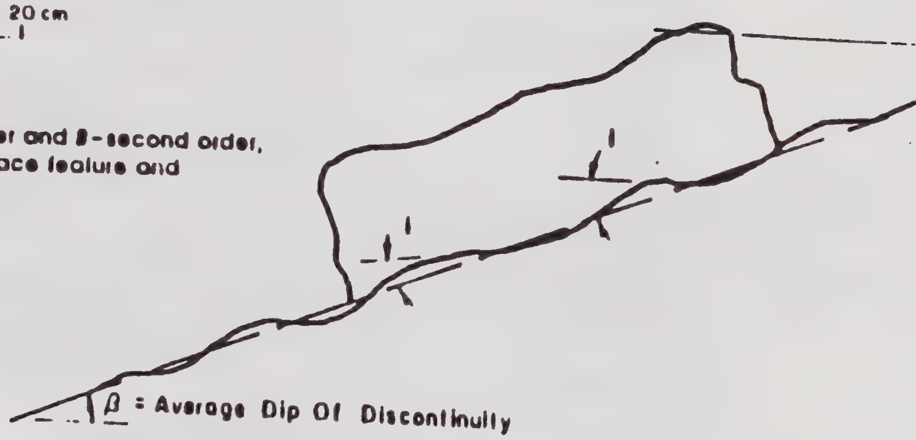


Figure B-5. Sketch of a rock block resting on an inclined irregular discontinuity

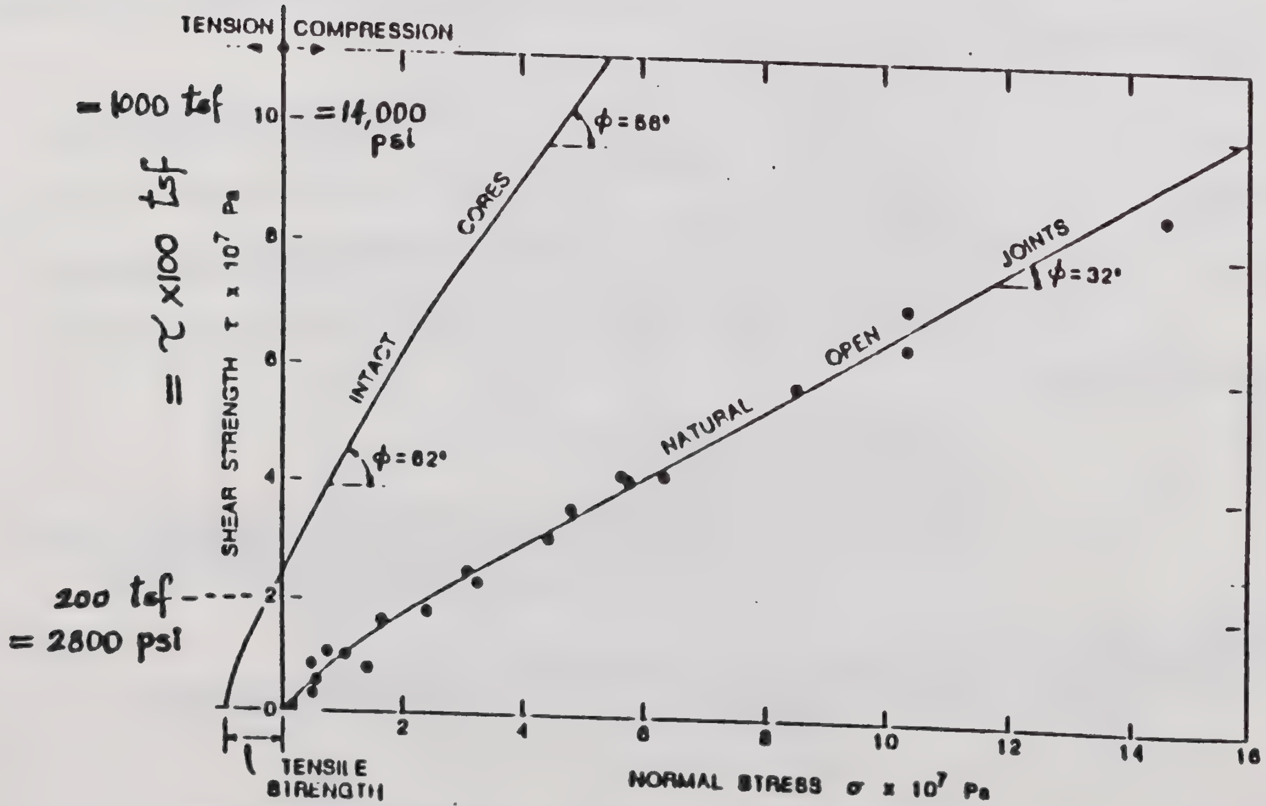


Figure B-6. Comparison of Mohr strength envelopes of intact cores and natural open-joint shear strengths for quartz monzonite.

Page: A-12

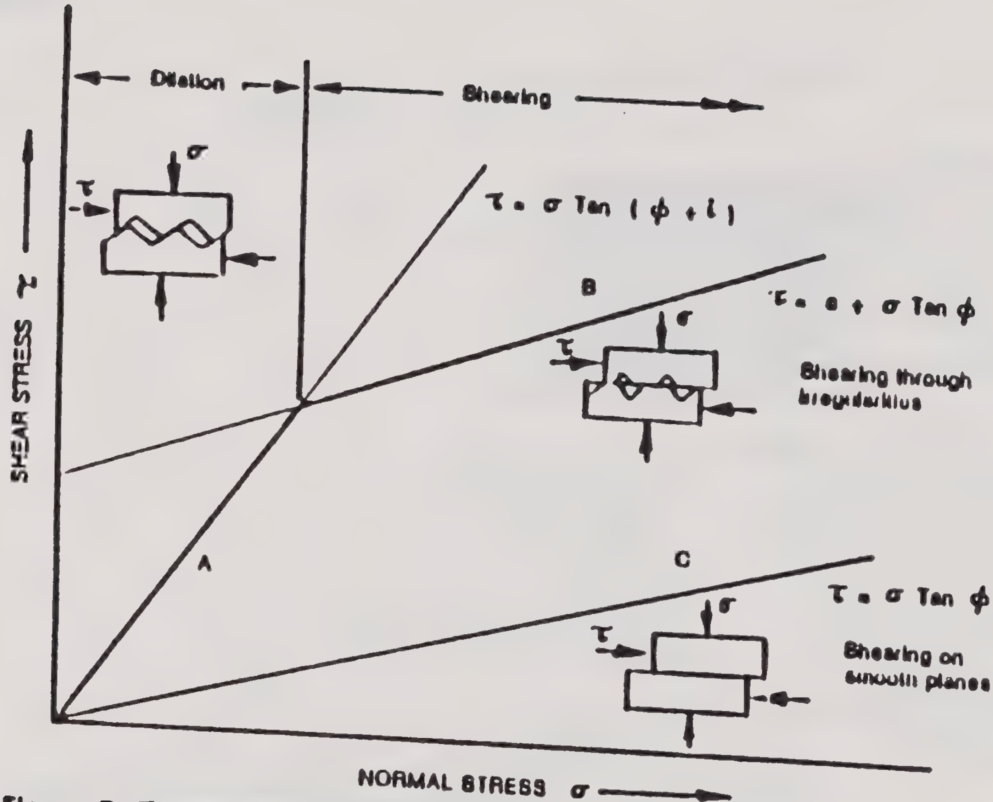


Figure B-7. Simplified relationships between shear strength and normal stress for rough surfaces, where ϕ = friction angle and i = inclination of surface irregularity to plane surface.

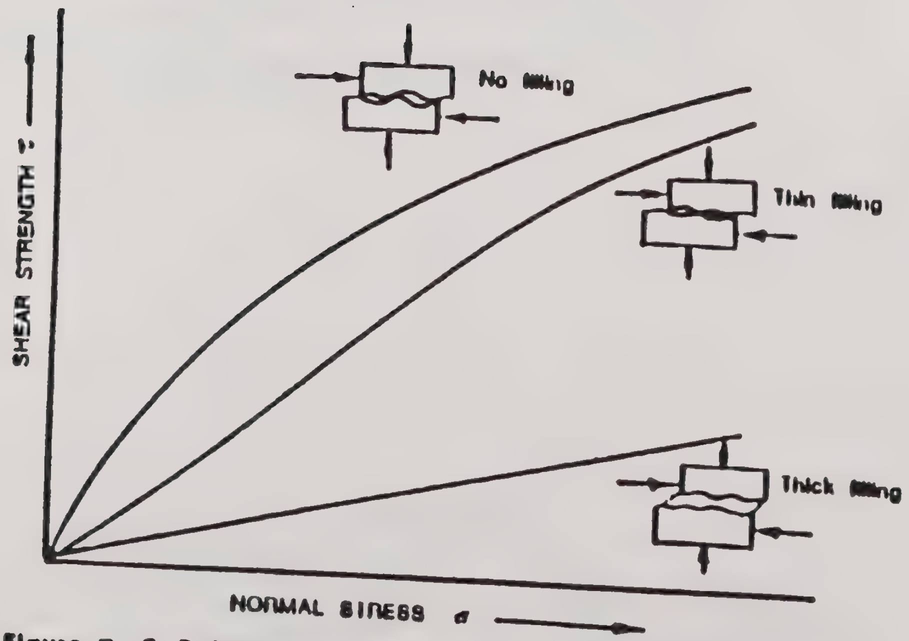


Figure B-8. Relationships between shear strength and normal stress for discontinuities with different thicknesses of gouge infilling.

JOINTS GEOMETRIC PATTERN

1. BEDDING (Bed thickness in feet)

Very thick-bedded	Greater than 4.0
Thick-bedded	2.0 to 4.0
Thin-bedded	0.2 to 2.0
Very thin-bedded	0.05 to 0.02
Laminated	0.01 to 0.05
Thinly laminated	less than 0.01

2. FRACTURING (Size of pieces in feet)

Very litle fractured	Greater than 4.0
Occasionally fractured	1.0 to 4.0
Moderately fractured	0.5 to 4.0
Closely fractured	0.1 to 0.5
Intensely fractured	0.05 to 0.1
Crushedless than	0.05

3. ORIENTATION (Dip or Foliations)

Very favorable	0 to -60 degrees dip into the slope (into the hillside).
Favorable	+1 to +10 degrees dip with the slope (parallel to the slope).
Fair	+10 to +20 degrees dip with the slope.
Unfavorable	+20 to +30 degrees dip with the slope.
Very Unfavorable	+30 to +60 degrees dip with the slope

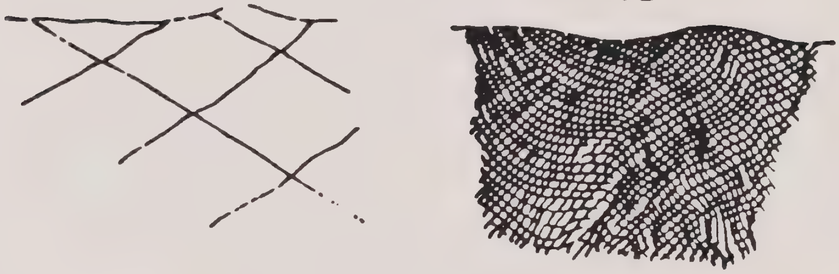
4. UNIFORMITY

Nonuniform	Irregularly oriented joints, creating blocks interlock (favorable).
Uniform	Regularly oriented joints, creating preferred directions of weakness within the rock mass (unfavorable).

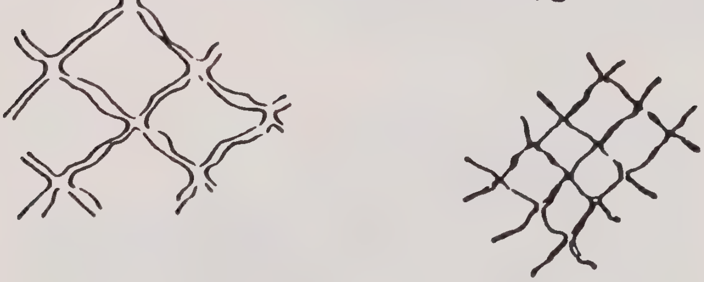
5. CONTINUITY

Discontinuous	Joints has intervening rock or rock bridges that transfer stress (favorable).
Continuous	Joints are long and continuous (unfavorable).

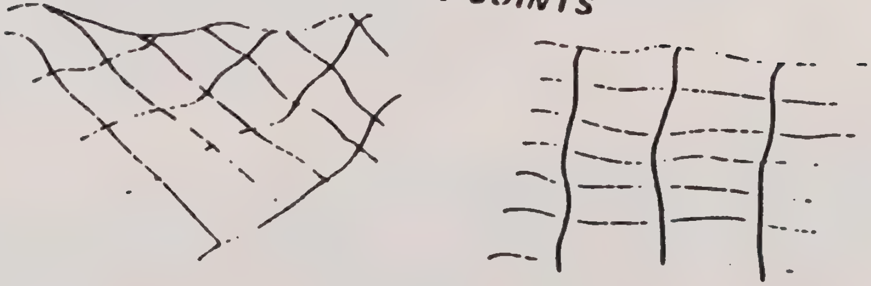
SPACING OF OPEN JOINTS



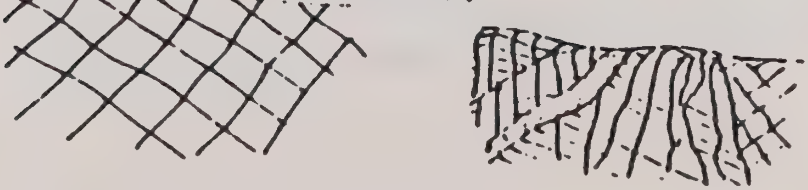
SIZE OF OPEN JOINTS



DIRECTIONS OF OPEN JOINTS



UNIFORMITY



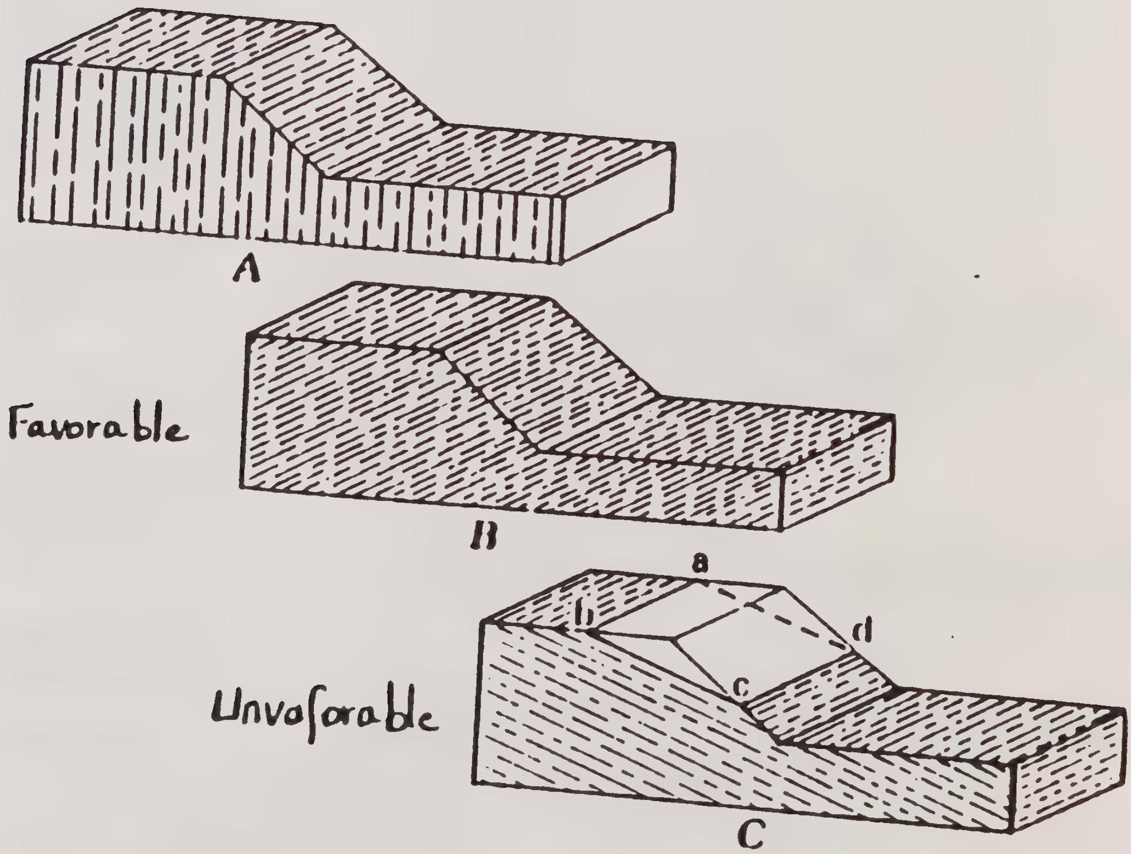


FIGURE B-9—The orientation of joints or other breaks may affect the stability of a slope. Vertical joints in block A and inclined joints that dip into the slope in block B do not significantly reduce stability. Outward-dipping joints in block C define planar failure surfaces, one of which (abcd) is outlined. Most jointed or fractured rocks exhibit more than one set of breaks; intersection of fracture sets having different orientations can cause other, nonplanar types of failures.

APPENDIX F

REDWOOD CREEK VILLAGE HYDRAULIC STUDY

LYNN BOWERS & ASSOCIATES, INC.
civil & traffic engineering • land planning
4466 Black Ave., Suite G• Pleasanton, CA 94566 • (510) 484-5445 • (510) 484-5255 • Fax (510) 484-5352

Michael P. Boyle
12240 Blythan Way
Oakland, Ca. 94619

June 15, 1992

Dear Mr. Boyle;

The "Redwood Creek Village Hydraulic Study", prepared by Lynn Bowers & Associates, Inc., is enclosed. The project site is composed of nine (9) drainage areas. The basic findings are that, upon development, eight (8) of the storm drainage areas will have no adverse hydraulic impact. The remaining storm drainage area (POC Section #1) will experience substantially increased flow velocity. The effects of the increased flow velocity can be mitigated.

Soil erosion or siltation are related to changes in land use, and to the construction activities. However, erosion or siltation will not be increased by the completed project since flow velocities are controlled. An Erosion Control Plan, prepared in accordance with A.C.F.C. & W.C.D Standards, will mitigate any erosion caused by construction activities.

If you have any question relative to this report or our findings, please give me a call.

Yours truly,

Marvin Smitherman

Marvin Smitherman, Jr., R.C.E. 3082
LYNN BOWERS & ASSOC., INC.

LYNN BOWERS & ASSOCIATES, INC.
civil & traffic engineering • land planning
4466 Black Ave., Suite G• Pleasanton, CA 94566 • (510) 484-5445 • (510) 484-5255 • Fax (510) 484-5352

REDWOOD CREEK VILLAGE HYDRAULIC STUDY

Prepared by
Lynn Bowers & Associates, Inc.
June 1992

PURPOSE OF STUDY:

The purpose of this report is to evaluate the hydrologic and hydraulic impact that the proposed Redwood Creek Village Development, Tract 5762, will have upon the storm runoff and on the adjacent properties . Potential for soil erosion and silt transportation into Redwood Creek and the Upper San Leandro Reservoir are considered.

EXISTING SITE VICINITY CONDITIONS:

The project property is currently characterized as mixed evergreen woodland. The adjacent property was gifted to the East Bay Regional Parks District in September of 1975 for open space, water shed, and fire protection purposed with public access to be restricted. The adjacent property and 80% of the project property will remain undisturbed. Redwood Creek is located approximately 500 to 1500 feet downstream of the project property. There are currently two single family residences and an access road. The Hydrology Map for the existing conditions is shown as Figure 1 - "Existing Drainage - Redwood Creek Village". Photographs, at several locations, are referenced on Figure 1 and included as Figures 3, 4, and 5.

PROPOSED DEVELOPMENT:

The proposed development will have five (5) new private streets and 42 new single family homes. This will change runoff by modifying the drainage areas, increasing the coefficient of runoff for some locations, and changing the times of concentration.

The hydrology map for the proposed development is shown as Figure 2 - "Proposed Drainage Plan - Redwood Creek Village".

METHODOLOGY:

The Alameda County Flood Control and Water Conservation District Hydrology and Hydraulics Criteria Summary, dated Feb. 1987, was used to evaluate the project. This Criteria uses a modified rational formula for the runoff flow rate calculations. The rates of flow were calculated at nine P.O.C. (Point of Concentration) sections, as shown of Figure 1 and Figure 2. These sections are locations where the natural drainage courses crossed the property boundary. Further analysis downstream is not needed if there is insignificant impact, or impacts can be mitigated, at these POC sections.

Table #1 - "Storm Drainage Runoff Summary" shows the calculated runoff flow rates for the "Existing" and "Proposed" conditions. Design storms having a recurrence interval of 5, 10, 15, 25 and 100 years were analyzed. The referenced criteria specifies that the design storm for this project is a 10 year recurrence interval. The additional intervals were considered for project life time comparison.

Table #2 - "Channel Flow Summary" shows the calculated channel flow characteristics at the four P.O.C. sections (1, 3, 6, and 7) where the proposed development will increase runoff. The locations of these POC Sections are shown on Figures 1, and 2. Channel flow calculations were not made for POC sections where flows are decreased since any hydraulic impacts are also decreased. The channel slope, velocity and depth of flow are summarized for design storms having a 10 year and a 100 year recurrence interval at these POC sections.

DISCUSSION:

Adverse hydraulic impacts can occur in two ways. A significant increase in the runoff flow rate can result in the following:

1) Increase the potential for flooding (characterized by increased channel depth

DISCUSSION: (continued)

of flow).

2) Increase the potential for erosion (characterized by increased channel flow velocities).

A decrease in the runoff flow will have no significant adverse hydraulic impact.

The increase in channel flow depth calculated between a 10 year and a 100 year recurrence interval design storm ranges from 0.02 feet to 0.27 feet. Therefore the potential for an adverse impact due to flooding is insignificant.

The proposed development will decrease the peak flow rates at POC sections #2, 4, 5, 8, and 9. There will therefore be no significant adverse erosion or hydraulic impacts at POC sections #2, 4, 5, 8, and 9.

The proposed development will increase the peak flow rates at POC Sections # 1, 3, 6, and 7. The Channel Flow Summary, Table 2, shows the calculated depth and velocity of flow at these sections.

Erosion and sediment transport depend upon the flow velocity. Large flow velocity can cause channel scour. Low flow velocity can cause channel siltation. The ACFC & WCD Hydrology and Hydraulic Criteria Summary requires that the flow velocity for new ACFC & WCD designed earth channels be greater than 2.0 feet/second (to minimize siltation) and less that 6.0 feet/second (to minimize scour).

The channel flow velocities calculated for POC sections # 3 and 6 are within the limits required by ACFC & WCD. The potential adverse siltation and hydraulic impact at POC section #3 and 6 are therefore insignificant.

DISCUSSION: (continued)

POC section #1 drains to a 15" reinforced concrete pipe. The proposed development calculated flow velocity for a ten year recurrence interval design storm is 18.3 feet/second. The ACFC & WCD Criteria requires that "... special criteria ... on a case by case basis ... " shall apply where the flow velocity exceeds 14 feet/second in a pipe. The normal requirement is that special thick wall reinforced concrete pipe be provided where the 14 feet/second velocity is exceeded. Therefore, there will be an adverse impact at POC #1. However, this impact can be mitigated by one of the following:

a) Verify that the existing 15" RCP pipe complies with the ACFC & WCD special pipe requirements.

b) Modify the existing 15" RCP (if necessary) pipe to comply with the ACFC & WCD special pipe requirements.

POC section #7 drains to a natural earth channel. The proposed development calculated channel velocity will increase from 0.9 feet/second to 1.1 feet/second for the 10 year recurrence interval design storm. Although this velocity is less than the ACFC & WCD recommended velocity of 2.0 feet/second minimum, the proposed development will result in an increase in the velocity, thereby decreasing the potential for siltation. Therefore, the proposed development will have a slight beneficial impact at POC section #7.

Erosion resulting during the construction of this project could cause an adverse impact. This potential adverse impact can be mitigated by the implementation of an Erosion Control Plan in conformance with Alameda County standard requirements.

CONCLUSIONS:

The proposed project will not cause a significant adverse siltation or hydraulic impact to Redwood Creek or Upper San Leandro Reservoir.

There will be no adverse siltation or hydraulic impact at POC sections #2, 3, 4, 5, 6, 7, 8, and 9.

Erosion resulting during the construction of this project could cause an adverse impact. This impact can be mitigated by the implementation of a standard construction Erosion Control Plan in conformance with Alameda County standard requirements.

There may be an adverse impact at POC section #1 as velocities exceed 14 ft/sec. This impact can be mitigated by one of the following:

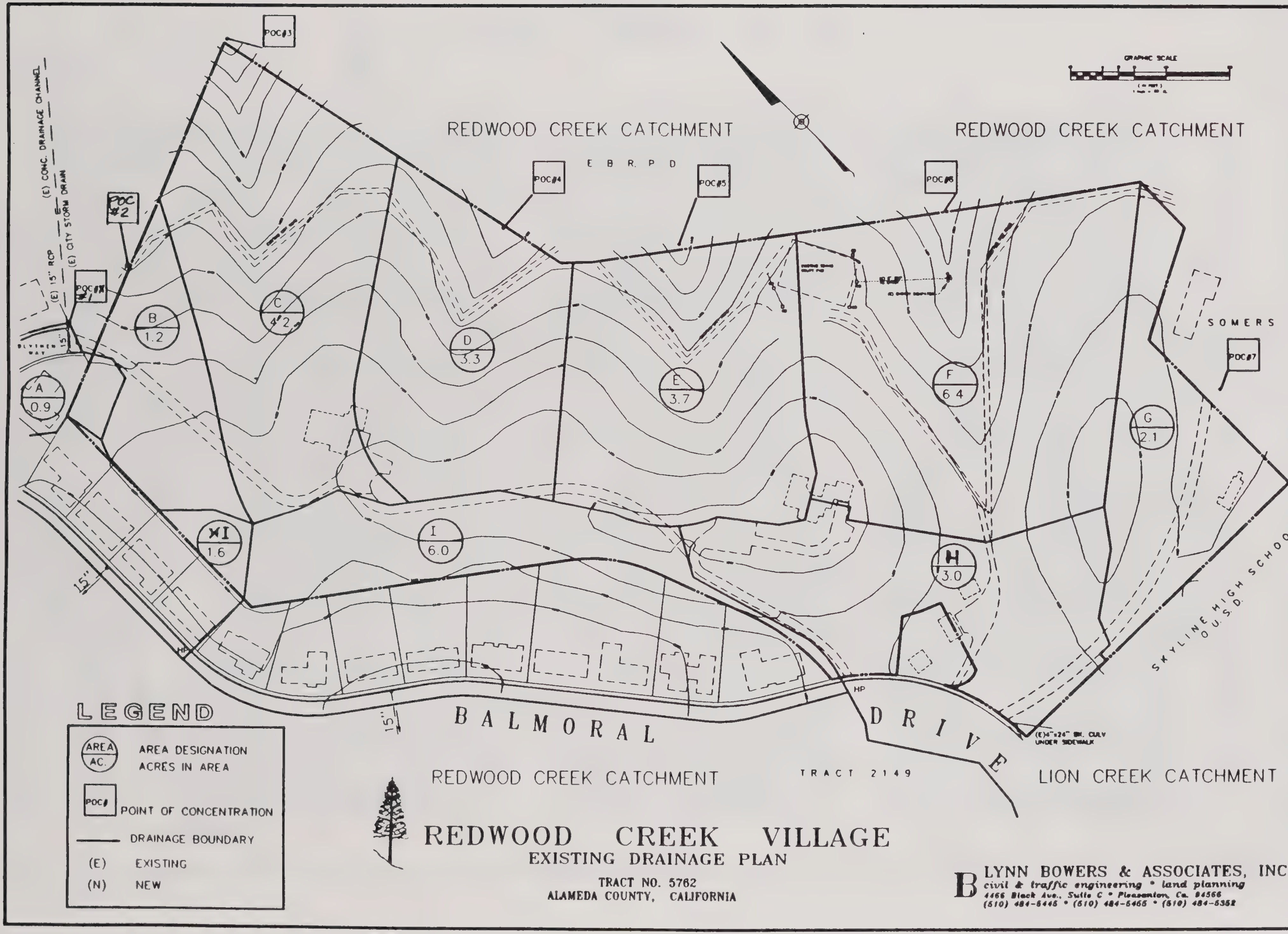
a. Verify that the existing 15" RCP complies with the ACFC & WCD special thick wall pipe requirement for pipe with flow velocity in excess of 14.0 Feet/second.

b. Modify the existing 15" RCP to comply with the ACFC & WCD special thick wall pipe requirements (if necessary) for pipe with flow velocity in excess of 14.0 feet/second.

FIGURE 3 PANORAMIC VIEW

FIGURE 4 NATURAL SWALE SECTION

FIGURE 5 TYPICAL FOREST FLOOR DUFF


REDWOOD CREEK CATCHMENT
REDWOOD CREEK CATCHMENT
E B R P D
POC#3
POC#4
POC#5
POC#6
POC#7
POC #2
POC #1
(E) CONC. DRAINAGE CHANNEL
(E) CITY STORM DRAIN
(E) 15" RCP
15"
A
0.9
B
1.2
C
4.2
D
3.3
E
3.7
F
6.4
G
2.1
H
3.0
I
6.0
XI
1.6
SOMERS
SKYLINE HIGH SCHOOL
O.U.S.D.
HP
HP
15"
15"
BALMORAL
DRIVE
(E)4"x24" BX. CULV UNDER SIDEWALK
REDWOOD CREEK CATCHMENT
TRACT 2149
LION CREEK CATCHMENT
LEGEND
AREA
AC.
AREA DESIGNATION
ACRES IN AREA
POC#
POINT OF CONCENTRATION
DRAINAGE BOUNDARY
(E) EXISTING
(N) NEW
REDWOOD CREEK VILLAGE
EXISTING DRAINAGE PLAN
TRACT NO. 5762
ALAMEDA COUNTY, CALIFORNIA
LYNN BOWERS & ASSOCIATES, INC.
civil & traffic engineering * land planning
4466 Black Ave., Suite C * Pleasanton, Ca. 94566
(510) 484-5445 * (510) 484-5465 * (510) 484-5352

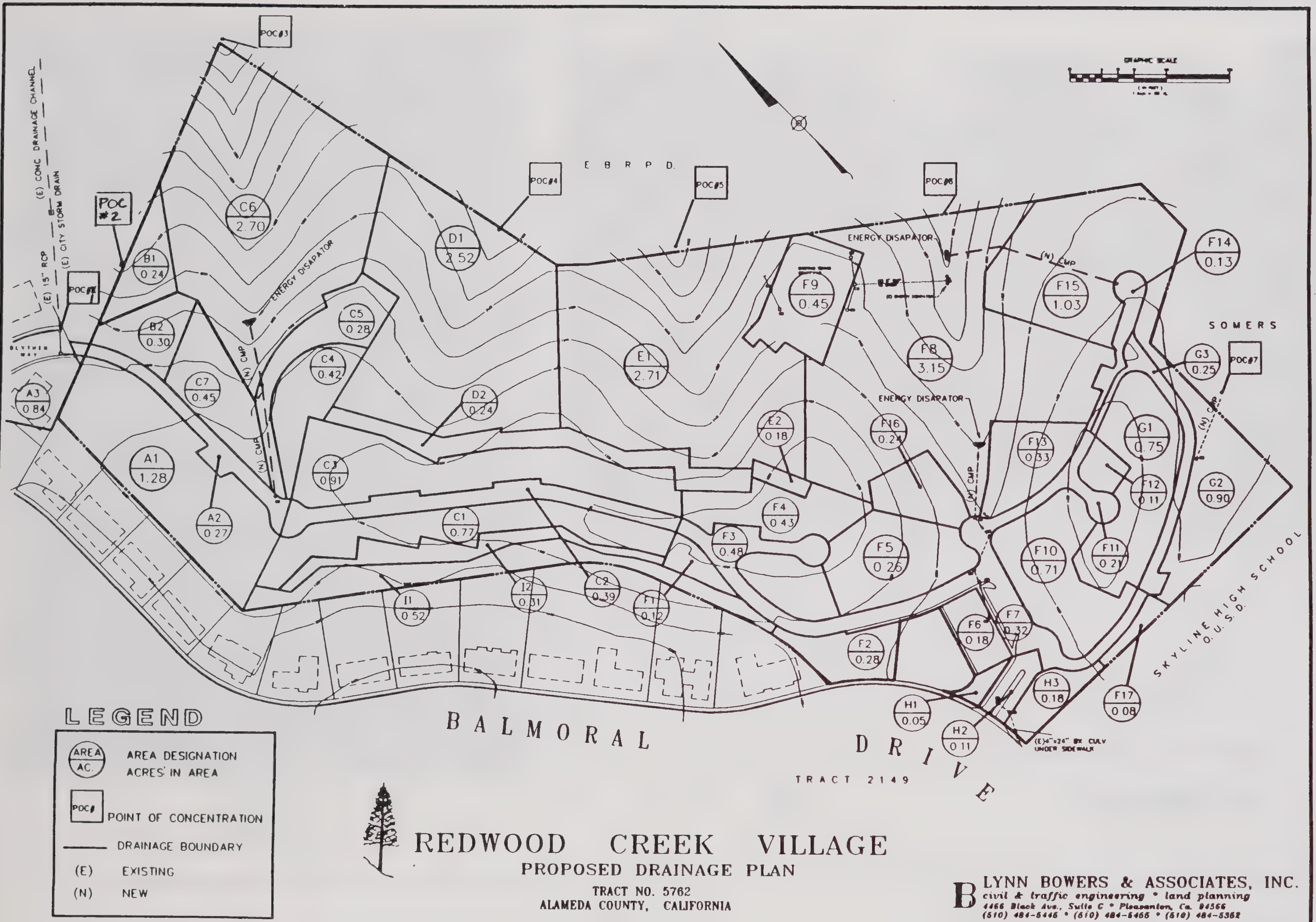

POC#3
POC#4
POC#5
POC#6
POC#7
POC #2
POC#1
E B R P D.
SOMERS
SKYLINE HIGH SCHOOL
O. U. S. D.
(E) CONC DRAINAGE CHANNEL
(E) CITY STORM DRAIN
(E) 15" RCP
ENERGY DISAPATOR
(N) CMP
(N) CMP
GRAPHIC SCALE
C6 2.70
B1 0.24
B2 0.30
A3 0.84
C7 0.45
A1 1.28
A2 0.27
C5 0.28
C4 0.42
C3 0.91
D1 2.52
D2 0.24
C1 0.77
E1 2.71
E2 0.18
F9 0.45
F8 3.15
F15 1.03
F14 0.13
G3 0.25
F16 0.24
F13 0.33
G1 0.75
F12 0.11
G2 0.90
F4 0.43
F3 0.48
F5 0.26
F10 0.71
F11 0.21
I1 0.52
I2 0.31
C2 0.39
F1 0.12
F2 0.28
F6 0.18
F7 0.32
H1 0.05
H2 0.11
H3 0.18
F17 0.08
(E)4"x24" BX CULV UNDER SIDEWALK
BALMORAL DRIVE
TRACT 2149
LEGEND
AREA AC. AREA DESIGNATION ACRES IN AREA
POC# POINT OF CONCENTRATION
DRAINAGE BOUNDARY
(E) EXISTING
(N) NEW
REDWOOD CREEK VILLAGE
PROPOSED DRAINAGE PLAN
TRACT NO. 5762
ALAMEDA COUNTY, CALIFORNIA
LYNN BOWERS & ASSOCIATES, INC.
civil & traffic engineering • land planning
4466 Black Ave., Suite C • Pleasanton, Ca. 94566
(510) 484-5445 • (510) 484-5466 • (510) 484-5362

Table #1 – Storm Drainage Runoff Summary

Recurrence Interval (Yrs.)	P.O.C. #1			P.O.C. #2			P.O.C. #3		
	T_c	i	Q	T_c	i	Q	T_c	i	Q
Proposed (5)	6.25	2.76	3.81	5.00	3.02	0.91	9.77	2.21	7.96
Existing (5)	3.00	3.74	0.34	4.13	3.30	2.17	5.06	2.99	7.03
Proposed (10)	6.25	3.25	4.49	5.00	3.59	1.08	9.77	2.60	9.36
Existing (10)	3.00	4.45	0.40	4.13	3.93	2.59	5.06	3.56	8.37
Proposed (15)	6.25	3.48	4.81	5.00	3.85	1.16	9.77	2.78	10.0
Existing (15)	3.00	4.73	0.43	4.13	4.19	2.76	5.06	3.82	8.98
Proposed (25)	6.25	3.95	5.46	5.00	4.34	1.31	9.77	3.17	11.4
Existing (25)	3.00	5.15	0.46	4.13	4.73	3.12	5.06	4.32	10.2
Proposed (100)	6.25	4.86	6.71	5.00	5.38	1.62	9.77	3.93	14.2
Existing (100)	3.00	6.63	0.60	4.13	5.86	3.86	5.06	5.33	12.5

Recurrence Interval (Yrs.)	P.O.C. #4			P.O.C. #5			P.O.C. #6		
	T_c	i	Q	T_c	i	Q	T_c	i	Q
Proposed (5)	7.79	2.44	3.12	6.69	2.65	4.67	9.59	2.24	12.6
Existing (5)	3.00	3.74	6.84	3.00	3.74	8.74	5.64	2.89	8.73
Proposed (10)	7.79	2.91	3.72	6.69	3.15	5.54	9.59	2.63	14.8
Existing (10)	3.00	4.45	8.14	3.00	4.45	10.4	5.64	3.41	10.3
Proposed (15)	7.79	3.12	3.99	6.69	3.35	5.89	9.59	2.81	15.8
Existing (15)	3.00	4.73	8.65	3.00	4.73	11.1	5.64	3.67	11.1
Proposed (25)	7.79	3.54	4.53	6.69	3.80	6.68	9.59	3.20	18.0
Existing (25)	3.00	5.15	9.42	3.00	5.15	12.00	5.64	4.13	12.5
Proposed (100)	7.79	4.37	5.59	6.69	4.71	8.28	9.59	3.95	22.3
Existing (100)	3.00	6.63	12.10	3.00	6.63	15.5	5.64	5.10	15.4

Recurrence Interval (Yrs.)	P.O.C. #7			P.O.C. #8			P.O.C. #9		
	T_c	i	Q	T_c	i	Q	T_c	i	Q
Proposed (5)	5.80	2.83	3.42	5.00	3.02	0.72	5.00	3.02	1.63
Existing (5)	9.51	2.24	1.72	5.37	2.91	3.38	3.00	3.74	4.00
Proposed (10)	5.80	3.35	4.05	5.00	3.59	0.86	5.00	3.59	1.94
Existing (10)	9.51	2.65	2.04	5.37	3.48	4.04	3.00	4.45	4.76
Proposed (15)	5.80	3.59	4.34	5.00	3.85	0.92	5.00	3.85	2.08
Existing (15)	9.51	2.83	2.18	5.37	3.72	4.32	3.00	4.73	5.06
Proposed (25)	5.80	4.08	4.93	5.00	4.34	1.04	5.00	4.34	2.35
Existing (25)	9.51	3.22	2.48	5.37	4.21	4.89	3.00	5.15	5.51
Proposed (100)	5.80	5.02	6.07	5.00	5.38	1.29	5.00	5.38	2.91
Existing (100)	9.51	3.98	3.06	5.37	5.20	6.04	3.00	6.63	7.09

T_c = Time of Concentration in minutes
i = Intensity in inches per hour
Q = Flow in cubic feet per second
P.O.C. – Point Of Concentration as shown on the Hydrology Maps.
Recurrence Interval in years
"Proposed" refers to the Hydrology Map shown as "Figure 2 – Proposed Drainage Plan – Redwood Creek Village"
"Existing" refers to the Hydrology Map shown as "Figure 1 – Existing Drainage Plan – Redwood Creek Village"

Table #2 – P.O.C. Sections – Channel Flow Summary

Recurrence Interval (Yrs.)	P.O.C. #1 – 15" RCP				P.O.C. #3 – Natural Channel			
	Q	s	d	v	Q	s	d	v
Proposed (10)	4.49	28%	0.32	18.3	9.36	45%	0.31	2.9
Existing (10)	0.40	28%	0.10	8.9	8.37	45%	0.29	2.8
Proposed (100)	6.71	28%	0.39	20.5	14.2	45%	0.40	3.4
Existing (100)	0.60	28%	0.12	10.1	12.5	45%	0.38	3.1

Recurrence Interval (Yrs.)	P.O.C. #6 – Natural Channel				P.O.C. #7 – Natural Channel			
	Q	s	d	v	Q	s	d	v
Proposed (10)	14.8	12%	0.59	2.2	4.05	6%	0.33	1.1
Existing (10)	10.3	12%	0.48	2.0	2.04	6%	0.22	0.9
Proposed (100)	22.3	12%	0.74	2.6	6.07	6%	0.42	1.3
Existing (100)	15.4	12%	0.60	2.3	3.06	6%	0.28	1.0

Q = Flow in cubic feet per second
s = Slope of channel in percent
d = Depth of flow in feet
v = Velocity of flow in feet per second

APPENDIX G

EAST BAY MUNICIPAL UTILITY DISTRICT
LANDSCAPE WATER CONSERVATION REQUIREMENTS

EAST BAY MUNICIPAL UTILITY DISTRICT

LANDSCAPE WATER CONSERVATION REQUIREMENTS

GENERAL

Landscape design and practices and related requirements necessary to achieve water conservation in a development project shall be as follows:

1. All ornamental uses of water in the common areas of a development project, such as ponds, lakes and fountains, shall be supplied, operated, and maintained with alternative sources of water if they are available.

2. All new landscaping on parcels of 6,000 square feet or more in a development project shall be designed, developed, and maintained in accordance with these Landscape Water Conservation Requirements.

3. Each model home in a development project shall demonstrate a water conserving landscape as follows:

   o Turf shall be limited to 25% of the planted area.

   o Non-turf areas shall use water conserving plants.

   o Planting, soils, irrigation, and use of other materials shall be in accordance with these Landscape Water Conservation Requirements.

4. Landscape plans shall be submitted to the District for review as to conformance with these requirements. The Applicant shall allow a minimum of 30 days for each review of landscaping plans and each re-review in the case of non-conformance with these requirements. Landscaping shall not be installed until the Applicant receives the District's written acceptance of the landscape plans. Maintenance of the landscaping in accordance with the plan accepted by the District shall be a condition of continued water service to the premises.

PLANTING DESIGN

1. Plants shall be selected which are best suited to the climate of the region and which require minimal water.

2. Combined turf and decorative uses of water will be limited to reduce water use and evaporation. Turf limitations excluded for public parks, golf courses, cemeteries and school grounds.

3. In addition to water conservation, the landscape plan will address functional as well as energy use and environmental conditions specific to each individual site. By differentiating the site into watering zones, water can be used where it is most needed and use can be minimized in areas where it is little needed.

4. Turfgrass perimeters will be minimized to improve irrigation efficiency. Long, narrow strips of turfgrass such as traffic medians and between curbs and sidewalks will be avoided. For each of maintenance and reduction of runoff, groundcovers other than lawns will be used on slopes exceeding 4%.

SOILS

1. A minimum of 1-2 inches of mulch should be added to the soil surface to reduce evaporation, moderate soil temperatures, and discourage weeks.

2. A soils test shall be provided showing soil type, soil depth and uniformity and pH. Soils vary widely in their water-holding capacity from site to site. Soil types and depth, and the uniformity of the soil profile will determine how much water should be applied, and how much water runoff is likely to occur.

3. Grading shall be minimized to avoid soil disturbance. Topsoil shall be stockpiled for backfill.

IRRIGATION

1. Specifications for the irrigation system will include a watering schedule. To improve irrigation efficiencies, irrigation schedules should be set according to the plant's actual water needs. Turfgrasses should be irrigated a maximum of once every three days. the following schedule shows how many inches of water turfgrass needs monthly, based upon climatic data for area.

	Inches/Month			Inches/Month	
Date	Inland	Coastal	Date	Inland	Coastal
January	0	0	July	6	5
February	1	1	August	5	4
March	2	2	September	3	3
April	3	3	October	2	2
May	4	3	November	1	1
June	5	5	December	0	0

2. Drip, bubbler irrigation systems or low spray heads should be used for shrubs, trees and groundcovers.

3. Separate valves should be installed for turf and non-turf areas. In many cases, mature plants require only infrequent irrigation. Separation of valves can provide more water to shallow-rooted plants or to those in shallow soils which need more frequent watering and less water to deep-rooted, mature shrubs and trees. Separate valves will encourage plants to extend deeper roots and to become less dependent on frequent watering.

4. Sprinkler heads should have matched precipitation rates within each control valve circuit.

MISCELLANEOUS

1. Use inert material as appropriate for landscaping needs. Inert material or pavement over a portion of the site with the remainder in drought tolerant groundcover offers an alternative to unbroken expanses or turf. Inert material or paving may be necessary where continual or heavy traffic occurs.

2. Use porous paving materials. In order to improve the percolation of rainwater into the groundwater table, porous paving materials are preferred. Wood decking is a very water conserving landscape treatment. It shades out weeds, stands up under traffic, cools the soil beneath, reduces soil moisture evaporation, and allows infiltration of rainwater into the soil and into the groundwater table. Epoxy aggregate paving, mortarless tile pavers, open drainage channels, and gravel or bark paving reduce the need for supplemental irrigation, and may eliminate the need for costly subsurface storm drainage systems.

IRRIGATION MANAGEMENT

1. Water should be applied so that it soaks into the soil slowly.

2. The application rate should neither exceed 0.25" per cycle nor 0.75" per hour. Avoid runoff by discontinuing the application of water as soon as it occurs. Watering in stages will allow water to soak in between applications, thus improving the efficiency of water use.

3. Electric controllers should2 be set to water between 7:00 p.m. and 10:00 a.m. Nighttime and early morning irrigation will reduce evaporation losses.

APPENDIX H

ORDINANCE NO. 0-89-45
AN ORDINANCE AMENDING CHAPTER 2 OF TITLE 8
OF THE ALAMEDA COUNTY ORDINANCE CODE RELATING TO ZONING

1860th

JUN 8 11 39 AM '89

ORDINANCE NO. 0-89-45

AN ORDINANCE AMENDING CHAPTER 2 OF TITLE 8 OF THE ALAMEDA COUNTY ORDINANCE CODE RELATING TO ZONING

The Board of Supervisors of the County of Alameda, State of California, do ordain as follows:

SECTION I

Chapter 2 of Title 8 of the Alameda County Ordinance Code is hereby amended in the following manner:

six (Assessor's) parcels containing approximately 10.12 acres, located at 5720 Balmoral Drive, approximately 700 feet north of the intersection with Skyline Boulevard, Oakland; bearing County Assessor's Designations: 85-101-113-1, 114-2, and 114-3, 85-102-18-6, 18-7, and 18-8, as shown on the map labelled "1860th Zoning Unit, Exhibit A, dated March 21, 1989", on file with the Alameda County Planning Commission at 399 Elmhurst Street, Hayward, California, is hereby rezoned to the PD (Planned Development) District allowing the following:

1) On parcels 85-101-114-2, 85-102-18-7 and 18-8 the provisions of the R-1 (Single Family Residence) District shall apply except as noted below:

a. Two primary and one secondary housing unit are allowed. One of the primary units shall be the single family residence existing on the property at the time of adoption of this ordinance. The secondary housing unit may be attached or detached. The secondary housing unit shall be significantly smaller than and subsidiary to the primary housing unit, and must provide at least one independently accessible parking space as defined by the Zoning Ordinance.

b. Any use or structure shall be subject to Site Development Review. This Site Development Review shall specifically ensure that there is no development on the downward slope of the property overlooking the Regional Park District properties, and that the design of any structure be in harmony with the neighborhood and the surroundings.

c. Any grading or tree removal from the site shall be subject to a Site Development Review.

2) On parcels 85-101-113-1 and 114-3, and 85-102-18-6 the regulations of the R-1-B-10 (Single Family Residence, 10,000 square foot m.b.s.a.) District shall apply.

A Map of the Unit is as follows:

APPENDIX I

ALAMEDA WHIPSNAKE HABITAT EVALUATION
ON THE PROPOSED REDWOOD CREEK VILLAGE DEVELOPMENT
(#ER 91-108)
ALAMEDA COUNTY, OAKLAND, CALIFORNIA
GARY A. BEEMAN, APRIL, 1992

GARY A. BEEMAN
Wildlife Biologist Consultant
777 Moraga Road
Lafayette, CA. 94549
(510) 284-2602

Copy

April 22, 1992

RECEIVED

APR 24 1992

Michael P. Boyle, President
Boyle Construction Company
12240 Blython Way
Oakland, CA. 94619
(510) 531-2514

Dear Mr. Boyle,

Subject: Alameda Whipsnake Habitat Evulation on the proposed Redwood Creek Village Development (#ER91-108) Alameda County, Oakland, CA.

As per our agreement, I performed a comprehensive habitat survey on the Redwood Creek Village site to determine if a trapping survey for the Alameda Whipsnake should be done.

The Alameda Whipsnake (AWS) (Masticophis lateralis euryxanthus) is listed as a threatened species by the California Department of Fish and Game, and as a Category 2 threatened species by the United States Fish and Wildlife Service. A species is listed as Category 2 when present information indicates that proposing to list the species as threathed or endangered is probably appropriate, but complete conclusive data on biological vulnerability and threat is not currently aviailable.

The AWS is a large slender snake (up to 60+ inches), fast-moving, daytime species that has a narrow neck and a relatively broad head with large eyes. Color is black to dark brown above, with a distinct orange to yellow-orange stripe down each side to or beyond the vent. In this subspecies of M. lateralis the lateral stripes are one and two half-scale rows wide. The forward portions of the ventral surface are orangish, and the posterior portions are cream grading to pinkish on the underside of the body and tail.

It feeds primarily on lizards, but it may also take other snakes, frogs, mice, and birds. This snake is an active forager, hunting on warm sunny days when its major prey species, the western fence lizard (Sceloporus occidentalis) is also active. This snake displays a characteristic behavior of elevating the head often during foraging, presumably for the purpose of spotting prey and/or predators.

The AWS prefers chaparral or coastal scrub habitat, with a west to south to east facing exposure, usually containing grassy patches, and rocky outcroppings, and can also be found in gullies or stream courses near their prefered habitat. Most sightings have been within 600 feet of moist areas (e.g. riparian corridors, seeps, springs), which may be required for egg deposition. Males become active in mid-March to mid-April, while most females usually are encountered somewhat later (late May-June). This difference in activity may be the result of males travelling greater distances while actively seeking females in the early spring, and females moving to breeding sites in late spring.

Copy

I performed two AWS habitat field surveys on the proposed Redwood Creek Viliage Development site on April 1 and April 19, 1992. The nearest documented reported presence of the AWS from this site is aprox. 1 mile to the southwest at Lenona Park, on January 26, 1953. The nearest recent record (1990) is aprox. 2.5 miles to the north, at Eastport. This site only contains a small broken scrub habitat, probably under 1 3/4 acres, which has an almost nonexistent prefered prey species population for the AWS. This site is aprox. 1/3 of a mile from any reasonable possible habitat and not interconnected to this site with likely habitat. Generally a minimum of two acres of suspected AWS habitat needs to be present on a site before any trapping might be required. This area would also be a unlikely AWS habitat corridor as it is too far removed from other known or suspected AWS habitats. This project site was additionally evaluated using the Beeman/Mullen Habitat Suitability Index System, which gave a total score (33) of probability for AWS presence which places it in the low unlikely range. **It is my firm belief that the Alameda Whipsnake is highly unlikely to occur at this site and that trapping for this species is totally unwarranted.**

Sincerely,

Gary A. Beeman

Gary A. Beeman

cc: Orla Fahy, City of Oakland Planning Department
Terry Palmisano, California Department of Fish & Game

APPENDIX J

DR. NAOMI SIMS RESUME

Naomi Sims
Senior Biologist, Project Manager

At CERTIFIED/Earth Metrics, Ms. Sims serves as senior staff biologist and project manager. She is skilled in the preparation of Environmental Impact Reports (EIRs), Environmental Assessments, and biotic surveys. She has worked on San Francisco Bay wetland issues as they pertain to land development impacts as well as impacts to benthic biota of bay dredging. She has been involved in various biological analyses, including systematic site surveys for rare, threatened, and endangered botanical species on a given site, habitat evaluations and mapping, Endangered Species Act Section 7 Biological Assessments, and mitigation planning for sensitive habitats.

As Project Manager, Ms. Sims has prepared EIRs for residential projects, including both hillside and coastal zone projects as well as commercial projects, General Plan Amendments, and rezonings. Recent specific projects include the Cloisters Residential Subdivision Project EIR, Morro Bay; the Holmes Lumberyard Project EIR, Fort Bragg; the Richmond Enterprise Zone EIR, Richmond; and the Skypark Specific Plan EIR, Scotts Valley.

Ms. Sims has experience in agency consultation at the local, county, state, and federal levels. She is familiar with various regional and local regulations that pertain to natural resource protection, such as requirements of the Coastal Zone Management Act, analyses pursuant to Local Coastal Program Land Use Plans, and regulatory policy related to natural resources such as Section 404 of the Clean Water Act and the California State Resources Code. She is experienced in implementing the requirements of the California Environmental Quality Act and the National Environmental Policy Act.

Pursuant to her doctoral thesis research, Ms. Sims has extensive research and field experience in ecological and behavioral analysis with a particular emphasis on wetland wildlife habitat utilization.

EDUCATION:

- Ph.D., Rutgers University
- B.A., Douglass College, Rutgers University

APPENDIX K

EMILE L. LABADIE ASSOCIATES
REPORT ON SPECIES OF CONCERN
MARCH 29, 1993

APPENDIX K

HORTICULTURIST (NATIVE PLANT SPECIALIST)

QUALIFICATIONS AND STUDY METHODOLOGY

Mr. Emile L. Labidie, emeritus professor of horticulture at Merritt College in Oakland, and noted authority on California native plants, has systematically walked the site to search for occurences of the Helianthella castenea(Diablo Rock Rose) and the Viola pedunculata (wild pansy). Searches were conducted in 1991 and 1993 for the Diablo Rock Rose and in 1993 for the Viola. The 1993 searches were conducted on three different days by walking the site in a grid pattern. The north facing slopes were subject of concentrated searches. The Diablo Rock Rose was knownn to be in bloom on Mt. Diablo during the period of the 1993 searches.

LABADIE & ASSOCIATES Horticultural Consultants

2690 Las Aromas, Oakland, California 94611 (510) 531-5716 or (916) 862-1180 Emile L. Labadie

March 29. 1993

Mike Doyle
12240 Blythen Way
Oakland, CA 94619

RE: Redwood Creek Village

Consultation re two plants, both California Natives, of which one may be visited by an endangered species of butterfly.

TO WHOM IT MAY CONCERN

The above plants are:

Helianthella castanea. Diablo Rock Rose
Mt. Diablo Sunflower

Viola pedunculata. Yellow Pansy
Wild Pansy
Johnny-Jump-Up

The Butterfly is:

Speyeria callippe callipe The Callipe Silverspot.

I made three visits to the above property in 1993 (March 8, March 15 and March 29), I have not to date seen the above plants, even though they have been in bloom on Mt. Diablo during this period.

I concentrated especially on the North-facing slopes, but I also covered other areas. I did see a Viola species; however, the foliage appeared to be quite different from that of the sought-for species. There was no flower to be seen at this time.

To present somewhat of a picture of the plant species that I did see during my search, I have listed plants into two categories - California Native Plants and Exotic Weeds. These are listed on the following page.

Certified Arborist #688 • International Society of Arboriculture • Pest Control Adviser #6120

PLANT ASSOCIATIONS AT REDWOOD CRREK VILLAGE:

CALIFORNIA NATIVES

Achillea sp.
Arbutus menziesii
Artemisia douglasi
Baccharis pilularis
Ceanothus cuneatus *
Chloragalum pomeridianum
Dentaria californica *
Fragaria chiloensis
Galium sp.
Heracleum lanatum
Heteromeles arbutifolia

Lonicera sp.
Lupinus sp.
Mahonia aquifolium *
Monardella sp.
Montia perfoliatum
Oenothera bistorta *
Polystichum munitum
Pteridium aquilinum,
Pinus radiata
Ranunculus sp. *
Rhamnus californica
Rosa sp.
Ruscus sp.
Sambucus caerulea
Sequoia sempervirens
Sidalacea malvaeflora
Symphoricarpus sp.
Thuja plicata
Toxicodendron diversilobum
Umbellularia californica *
Viola sp.
Zigadenus fremontii *

WEEDS

Bedstraw
Blackberry
Broom (2 species)
Catsear *
Chickweed, Common *
Hairy
Clover, Annual Sweet *
Cudweed
Dandelion *
Filaree - Red-Stem *
Forget-Me-Not *

Geranium - Cutleaf *
Manroot
Miners Lettuce
Nightshade
Nutgrass - Yellow
Plantain - Buckhorn *
Prickly Lettuce
Sheep Sorrel *
Thistle - Bull
Milk
Vetch
Winter Cress *

* Plants in Bloom

LABADIE & ASSOCIATES Horticultural Consultants

2690 Las Aromas, Oakland, California 94611 (510) 531-5716 or (916) 862-1180 Emile L. Labadie

February 2, 1993

Mike Boyle
12240 Blythen Way
Oakland, CA 94619-2410

Dear Mike,

Have been digging out information about the two plants that you mentioned. By coincidence - my copy of THE BAY LEAF came in the mail today. There is going to be a hike by members of the East Bay Chapter of the California Native Plant Society on March 7th. They will be looking at a stand of the Mt. Diablo Sunflower, Helianthella castanea! Note the date on which they will be looking for the plant.

I have some detailed descriptions of the plants:

HELIANTHELLA CASTANEA - Mt. Diablo Sunflower
Stems - several from the root crown.
Height - 10-13 inches
Leaves - Oblong or linear. Ovate to oblong. Lanceolate.Entire.
3 to 6 inches long.
Flowers - In heads which are 1 3/4 to 2 inches across. Solitary.
Yellow. April - May.
Comments - These are low perennial herbs, They are to be seen in the Mt. Diablo region on grassy hillsides, on north-facing slopes or on woody or brushy hillsides.

VIOLA PEDUNCULATA - Yellow Pansy, Wild Pansy, Johnny-Jump-Up.
Stems - From a thick, short, deeply-seated root crown. Branching at the soil surface.
Height - 4 to 13 inches.
Leaves - Round-ovate. Bright-green. Coarsely crenate. 1/2 to 1 1/2 inches long. Petioles one to two inches long.
Flowers - Petals a golden yellow. Upper ones dark brown on the outside. Others purple-veined within. February-April.
Comments - Found on low hills from 100 to 2000 feet. On grassy slopes. Apparently comes out in spring and then goes more or less dormant during the summer months.

I shall try to find some pictures of these plants. They might have some slides at Tilden Park.

Will contact you within a few days.

Sincerely,

Emile

Emile L. Labadie

Certified Arborist #688 • International Society of Arboriculture • Pest Control Adviser #6120

APPENDIX L

APPLICANT PROVIDED PROTOTYPICALS OF HOMES


EDWOOD CREEK VILLAGE
REDWOOD CR

LOT	TYPE	LOT	TYPE
1	A	26	N
2	A	27	D
3	B	28	E
4	C	29	H
5	K	30	(EXISTING)
6	E	31	(NOT APPLICABLE)
7	E	32	E
8	F	33	E
9	G	34	E
10	G	35	G
11	J	36	E
12	K	37	E
13	K	38	(EXISTING)
14	P	39	E
15	Q	40	K
16	R	41	E
17	K	42	K
18	K	43	L
19	E	44	L
20	P	45	M
21	E		
22	(NOT USED)		
23	K		
24	K		
25	S		

LEGEND

REDWOOD CREEK VILLAGE

OAKLAND, CA

L-3

MEGAN BICE ARCHITECTS

DATE

TYPE

FRONT

WEST ELEVATION
1/8" = 1'-0"

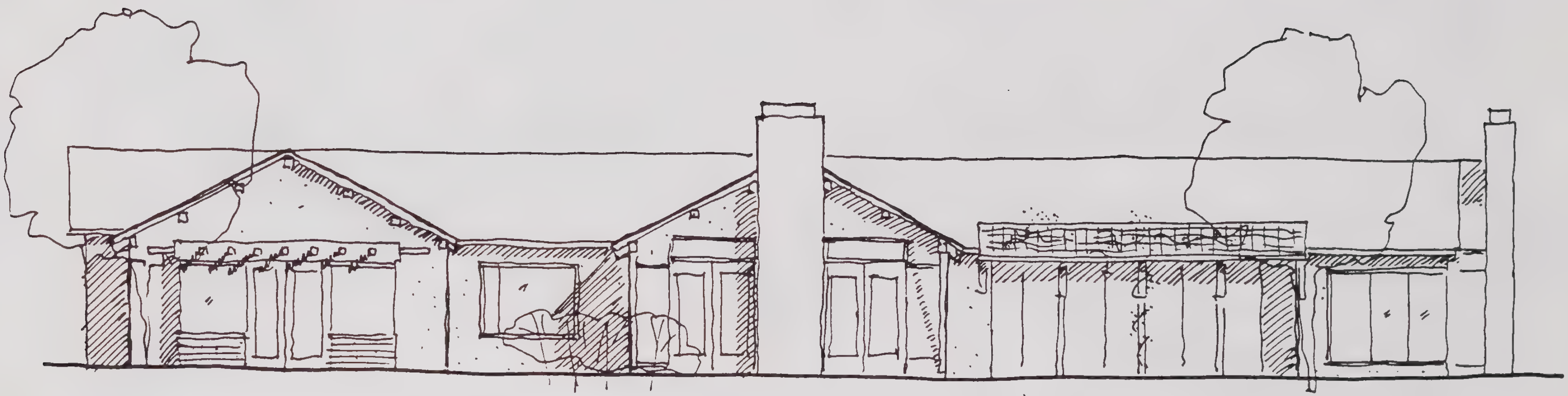
REGAN BICE
ARCHITECTS

REDWOOD CREEK VILLAGE
OAKLAND, CA

L-4

DATE 3.1

TYPE A



WEST ELEVATION
1/8"=1'-0"

REDWOOD CREEK VILLAGE
OAKLAND, CA
L-5

REGAN BICE ARCHITECTS

DATE 5.9
TYPE B

SOUTH ELEVATION
1/8"=1'-0"

REDWOOD CREEK VILLAGE
OAKLAND, CA

REGAN BICE ARCHITECTS

L-6

DATE 3.9

TYPE B

SOUTH ELEVATION

1/8" = 1'-0"

REDWOOD CREEK VILLAGE

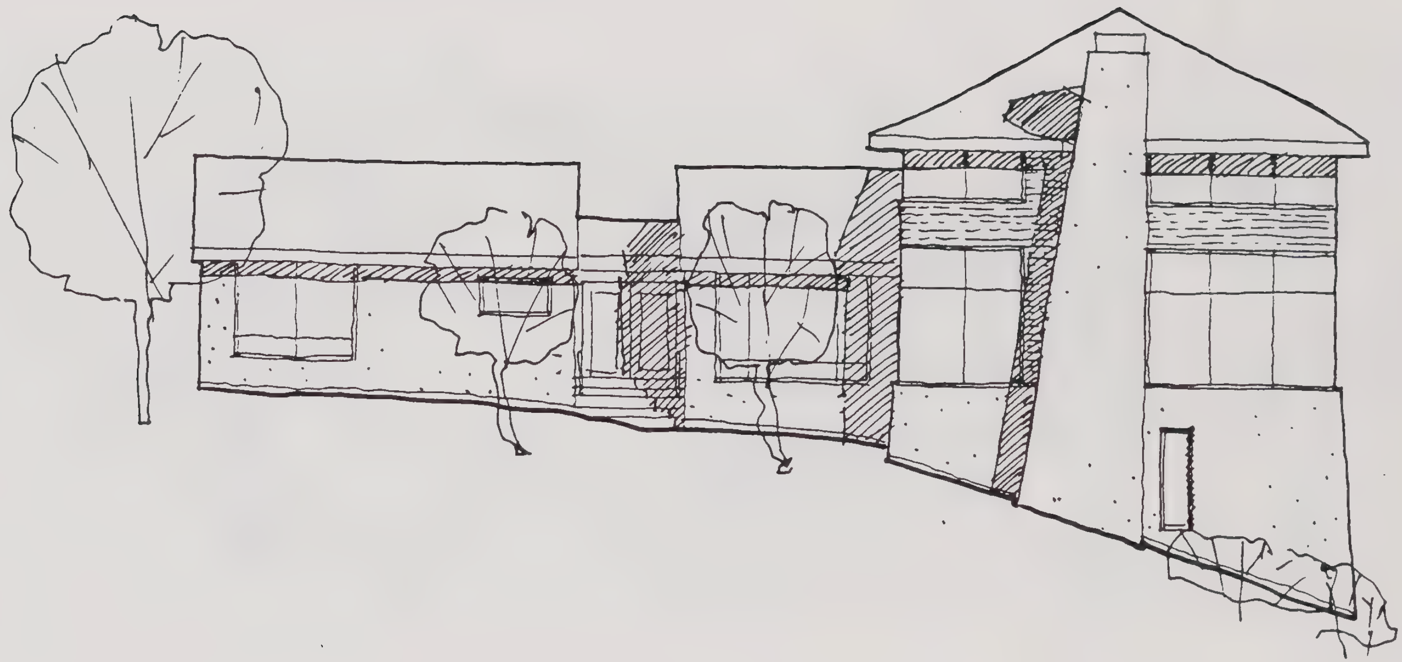
OAKLAND, CA

L-7

REGAN BICE ARCHITECTS

DATE 3.9

TYPE C



WEST ELEVATION
1/8" = 1'-0"

REGAN BICE ARCHITECTS

REDWOOD CREEK VILLAGE

OAKLAND, CA

L-8

DATE 3.9

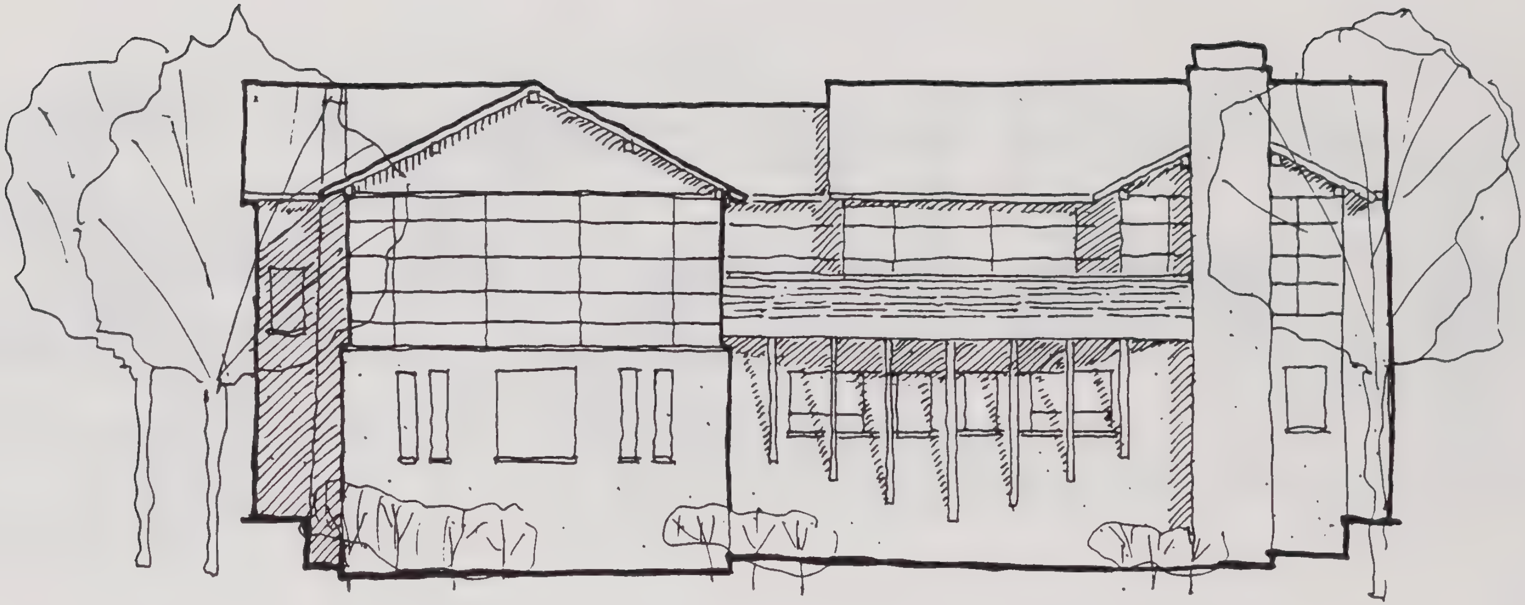
TYPE C

EAST ELEVATION
1/8" = 1'-0"

REDWOOD CREEK VILLAGE
OAKLAND, CA
L-9

DREGAN BICE
ARCHITECTS

DATE 3.1
TYPE D



WEST ELEVATION

REDWOOD CREEK VILLAGE

OAKLAND, CA

L-10

REGAN BICE ARCHITECTS

DATE 3.1

TYPE E

WEST ELEVATION
N.T.S.

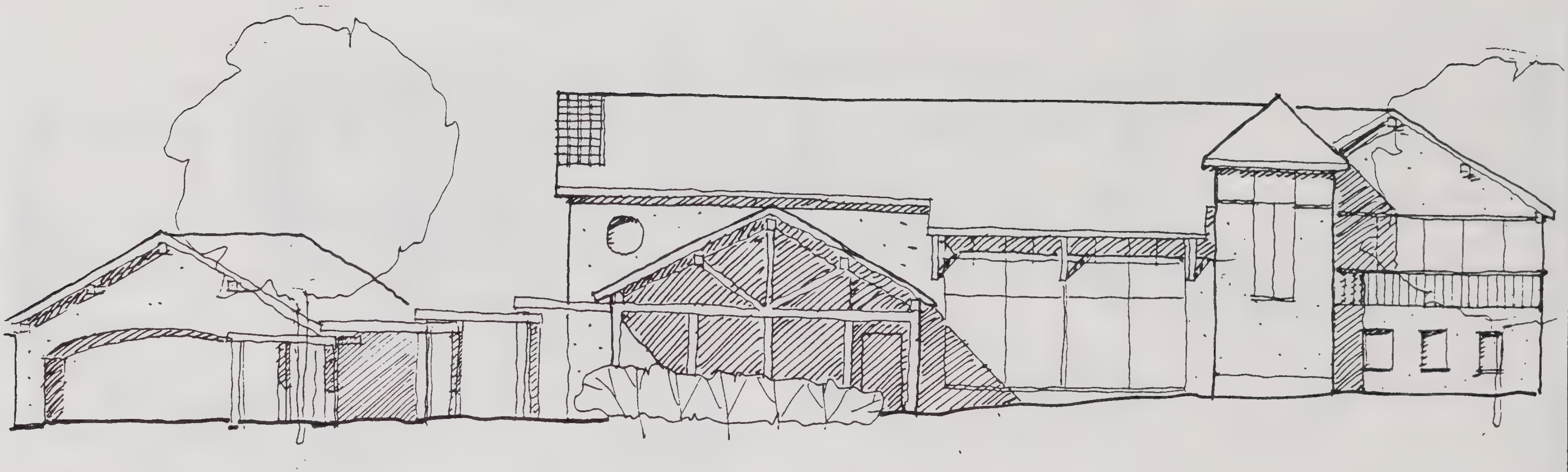
REDWOOD CREEK VILLAGE
OAKLAND, CA

REGAN BICE ARCHITECTS

I-11

DATE 3.1

TYPE F



EAST ELEVATION
1/8" = 1'-0"

REGAN BICE ARCHITECTS

REDWOOD CREEK VILLAGE
OAKLAND, CA
L-12

DATE 3.9
TYPE G

WEST ELEVATION
1/8" = 1'-0"

REDWOOD CREEK VILLAGE
OAKLAND, CA
L-13

REGAN BICE ARCHITECTS

DATE 3.9
TYPE G

WEST ELEVATION

1/8" = 1'-0"

REDWOOD CREEK VILLAGE

OAKLAND, CA

I-14

REGAN BICE ARCHITECTS

DATE 3.1

TYPE J

2 SOUTH ELEVATION
1/8" = 1'-0"

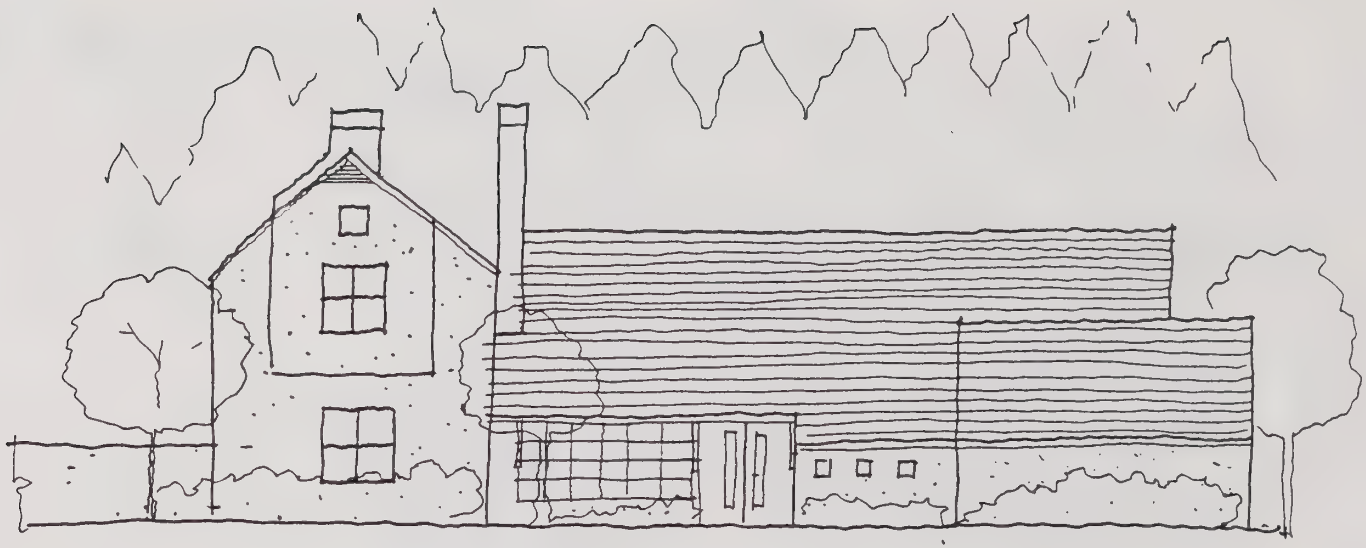
1 ALT. SO. ELEVATION
1/8" = 1'-0"

□ REGAN BICE ARCHITECTS

REDWOOD CREEK VILLAGE
OAKLAND, CA

L-17

DATE 3.1
TYPE L



STREET ELEVATION

1/8" = 1'-0"

REDWOOD CREEK VILLAGE

OAKLAND, CA

L-18

REGAN BICE ARCHITECTS

DATE 3.1

TYPE P

WEST ELEVATION

REDWOOD CREEK VILLAGE

OAKLAND, CA

L-19

REGAN BICE ARCHITECTS

DATE 3.1

TYPE P

WEST ELEVATION

1/8" = 1'-0"

LOT 25

REDWOOD CREEK VILLAGE

OAKLAND, CA

REGAN BICE ARCHITECTS

L-20

DATE 3.1

TYPE S

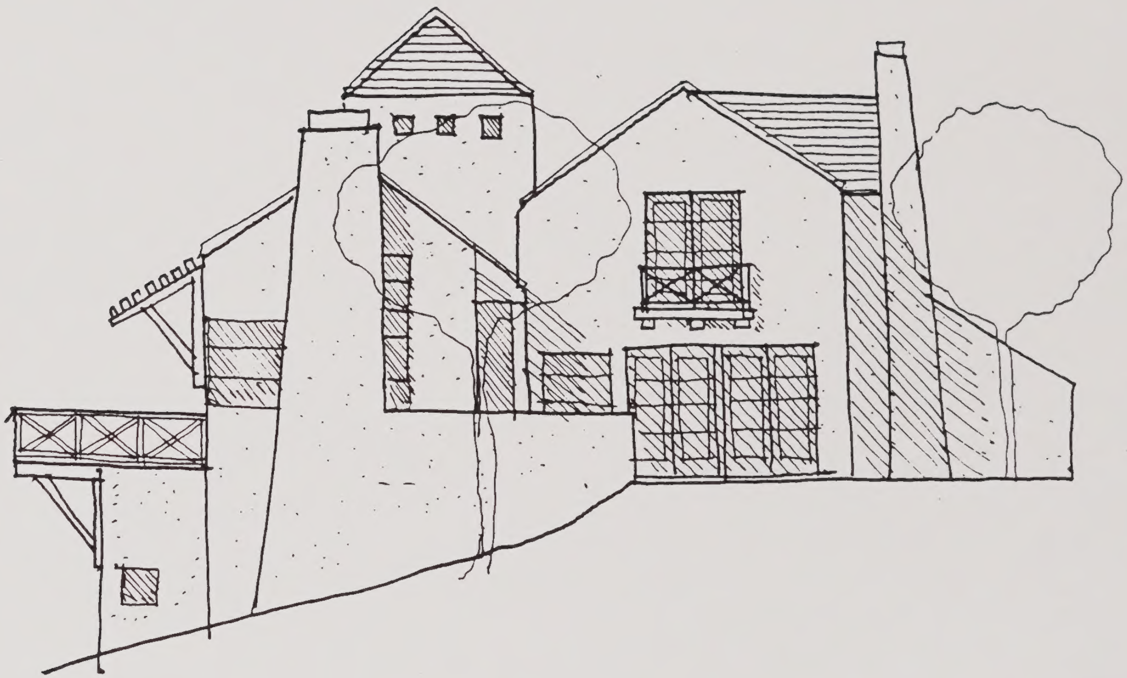
NORTH ELEVATION
1/8"=1'-0"

REDWOOD CREEK VILLAGE
OAKLAND, CA

L-21

REGAN BICE ARCHITECTS

DATE 3.1
TYPE S



SOUTH ELEVATION

1/8" = 1'-0"

REDWOOD CREEK VILLAGE

OAKLAND, CA

L-22

REGAN BICE ARCHITECTS

DATE 3.1

TYPE S